VOL. 62, No. 4 APRIL, 1937

THE PHILIPPINE JOURNAL OF SCIENCE

MANILA
BUREAU OF PRINTING
1937

7828

DEPARTMENT OF AGRICULTURE AND COMMERCE

EULOGIO RODRIGUEZ, A.B., *Secretary*
JOSÉ S. CAMUS, B.AGR., *Under Secretary*

THE PHILIPPINE JOURNAL OF SCIENCE

Published by the Bureau of Science, Department of Agriculture and Commerce

[Entered at the Post Office at Manila, P. I., as second-class matter.]

A. S. ARGÜELLES, B.S., CH.E., *Editor*
EDUARDO QUISUMBING, PH.D., *Associate Editor*
VICENTE G. BUNUAN, A.B., B.S.E., *Managing Editor*
SOPHIE RODOLFO, M.A., *Copy Editor*

CONTRIBUTING EDITORS

Chemistry

MANUEL L. ROXAS, PH.D.; A. P. WEST, PH.D.; T. DAZ JUAN, PHAR.D.
F. D. REYES, B.S.; F. T. ADRIANO, PH.D.; R. H. AGUILAR, CH.E.
A. J. HERMANO, SC.D.; J. C. ESPINOSA, B.S. IN CH.E.
MARIA Y. OROSA, PH.C., M.S.; MARCOS M. ALICANTE, PH.D.

Geology

V. ELICAÑO, B.S.; Q. A. ABADILLA, E.M.; JOSÉ M. FELICIANO, PH.D.

Experimental Medicine

ONOFRE GARCIA, M.D.; H. W. WADE, M.D.; ARTURO GARCIA, M.D.
DANIEL DE LA PAZ, M.D.; CRISTOBAL MANALANG, M.D.
VICTOR BUENCAMINO, D.V.M.; TEODULO TOPACIO, D.V.M., D.SC.

Clinical Medicine

ANTONIO SISON, M.D.; LIBORIO GOMEZ, M.D., PH.D.
JOSÉ ALBERT, M.D.; H. LARA, M.D.
JOSÉ RODRIGUEZ, M.D.; CARMELO REYES, M.D.

Botany

ELMER D. MERRILL, D.SC.; WILLIAM H. BROWN, PH.D.; J. K. SANTOS, PH.D.
A. F. FISCHER, C.E., M.F.; T. G. FAJARDO, PH.D.
JOAQUIN MARAÑON, SC.D.; RAFAEL B. ESPINO, PH.D.
NICANOR G. TEODORO, PH.D.; VICENTE C. ALDABA, PH.D.
FELICIANO M. CLARA, PH.D.

Zoölogy

MARCOS A. TUBANGUI, D.V.M.; HERACLIO R. MONTALBAN, M.A.
LEOPOLDO B. UICHANCO, SC.D.; GONZALO MERINO, PH.D.
FAUSTINO Q. OTANES, M.S.; HILARIO A. ROXAS, PH.D.
MANUEL D. SUMULONG, M.S., D.V.M.; LOPE M. YUTUC, D.V.M.
DEOGRACIAS VILLADOLID, PH.D.; CANUTO G. MANUEL, SC.D.

Anthropology

H. O. BEYER, M.A.; OTTO JOHNS SCHEERER, M.A.; E. E. SCHNEIDER, B.L.

THE PHILIPPINE JOURNAL OF SCIENCE

VOL. 62 APRIL, 1937 NO. 4

TAPEWORM PARASITES OF PHILIPPINE BIRDS

By MARCOS A. TUBANGUI and VICTORIA A. MASILUNGAN

Of the Bureau of Science, Manila

SEVEN PLATES

The Philippine cestode fauna is very imperfectly known, only the more common tapeworms infesting rats, domesticated mammals, and chickens having been reported. For this reason it was decided to study the collection of the Philippine Bureau of Science, which includes many specimens donated by members of the Fish and Game Administration. We wish to take this opportunity to express our indebtedness to this Division, especially to Dr. C. Manuel and Mr. F. Rivera, for their keen interest in collecting parasitological material from birds and other game animals.

Order CYCLOPHYLLIDÆ

Family ANOPLOCEPHALIDÆ Cholodkovsky, 1902

Genus APORINA Fuhrmann, 1903

APORINA DELAFONDI (Railliet, 1892) Baer. 1927. Plate 1, figs. 1, 2, and 3.

This is a widely distributed parasite, having been reported from different species of pigeons in various parts of the world. The Philippine specimens (No. 168) agree in all essential details with the descriptions of the worm as given by Fuhrmann (1902) and Southwell (1930), except in the following: (*a*) the cirrus sac is 0.22 to 0.28 millimeter long and extends slightly internally to the ventral longitudinal excretory vessel on the poral side; (*b*) the testes are 94 to 126 in number, occurring in two unequal groups, one on each side of the vitelline gland.

Host.—*Streptopelia dussumieri.*[1]
Location.—Intestine.
Locality.—Sitio Lumaba, Villaviciosa, Abra, Luzon.

Family DAVAINEIDÆ Fuhrmann, 1907

Genus RAILLIETINA Fuhrmann, 1920

Subgenus RAILLIETINA Stiles and Orleman, 1926

RAILLIETINA (RAILLIETINA) DAETENSIS sp. nov. Plate 1, figs. 4, 5, and 6.

This tapeworm differs from all the previously recorded members of the subgenus *Raillietina* in the following combination of characters; its very short, thickly-set segments, the lobulated ovary, the number and arrangement of the testes, and the size of the rostellar hooks.

External anatomy.—Maximum length 175 millimeters, maximum breadth 3.7 millimeters in region of mature proglottids. All segments much broader than long, except the most posterior ones which are bell-shaped and measure 0.85 by 1.15 millimeters. Head about 0.4 millimeter in diameter, separated from rest of body by a neck 1 millimeter long. Rostellum 0.08 by 0.13 millimeter in size, armed with 190 typical hammer-shaped hooks 23 to 31 microns long, arranged in two rows, the hooks in the anterior row larger than those in the posterior row. Suckers 0.09 to 0.10 millimeter in diameter, each armed with numerous hooklets 11.5 to 14 microns long, arranged in 6 to 7 rows. Genital pores unilateral, near middle of lateral margins of segments.

Musculature.—Longitudinal muscles arranged in two layers: a thicker outer layer of numerous irregular rows of small bundles of fibers and a thinner inner layer composed of one row of about sixty larger bundles. The dorsoventral and circular muscle fibers are fairly well developed.

Male genitalia.—Testes 12 to 15 (usually 14) in number, 60 to 95 microns in diameter, arranged in two unequal groups on each side of ovary, 5 to 7 being on the poral and 7 to 10 on the aporal side. Vas deferens very loosely coiled, extending almost transversely from cirrus sac to near median line and surrounded by only a few prostatic cells. Cirrus sac relatively small, 0.17 to 0.20 by 0.06 to 0.07 millimeter, not reaching longitudinal nerve; its cavity occupied by cirrus which is dilated and armed with hairlike spines.

[1] The scientific names of the bird hosts are as given by McGregor (1909).

Female genitalia.—Ovary asymmetrically bilobed and lobulated, each lobe composed of a few follicles; it has an expanse of 0.5 to 0.7 millimeter and is placed slightly towards the poral side of the segment. Vitelline gland small but prominent, transversely oval, 0.04 to 0.05 by 0.09 to 0.14 millimeter, to one side of median line and immediately behind ovary. The vagina is uniformly small in diameter, its terminal portion, which is muscular, opening immediately behind the cirrus into a very small genital sinus. The uterus is first seen as a small sac of the size of, and on the left side of, the vitelline gland; it soon enlarges and breaks into capsules, each containing 4 to 8 eggs. Each gravid segment contains approximately 120 of these egg capsules which are confined between the excretory vessels. No mature eggs were seen.

Specific diagnosis.—*Raillietina* (*Raillietina*): Length 175 millimeters, maximum breadth 3.7. Rostellar hooks 190, 23 to 31 microns long. Genital pore near middle of lateral margin of segment. Cirrus sac not reaching longitudinal nerve. Testes 12 to 15, 5 to 7 poral and 7 to 10 aporal. Ovary asymmetrically bilobed and lobulated, towards poral side of segment. Gravid segment with about 120 egg capsules, each containing 4 to 8 eggs.

Host.—*Treron* sp.

Location.—Intestine.

Locality.—Daet, Camarines Norte, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 333.

RAILLIETINA (RAILLIETINA) SEQUENS sp. nov. Plate 2, fig. 1.

Columbiform birds have been reported to be infested with several species of the subgenus *Raillietina*, which have the common characteristic of possessing not more than ten testes in each segment. The parasite in question as well as the one described below belongs to this group, the other principal characters of the members of which are given in Table 1. *R. sequens* bears the greatest resemblance to *R. quadritesticulata* Moghe, 1925, *R. flaviniata* Meggitt, 1931, and *R. torquata* var. *rajæ* var. nov. (see description below), differing from them only in the number and arrangement of the testes and in the number of egg capsules in each gravid segment.

External anatomy.—Maximum length 170 millimeters, maximum breadth 1.1 millimeters in region of gravid segments. Segments much broader than long except posterior gravid segments, which are bell-shaped to squarish and measure 0.4 to 0.7

TABLE 1.—*Comparison of species of Raillietina (Raillietina) parasitic in Columbiformes and possessing not more than ten testes in each segment.*

Species.	Size.		Rostellar hooks.		Length of hooks on suckers.
	Length.	Maximum width.	Number.	Length.	
	mm.	mm.		μ	μ
R. pseudotriciculata (Fuhrmann, 1909)	100	0.6	12?	9-10	8
R. spiralis (Raczyńska, 1914)	30-40	1.28	300	15	
R. quadriticulata Meghe, 1925	68-132 (Meggitt, 1931:320)	0.92 1.28 (Meggitt: 2)	180	6 (Meggitt: 8)	
R. torquata (Meggitt, 1924)	230	2.5	150	7-7.5	8
R. fimbriata (Meggitt, 1931)	50	0.8		9	
R. fragilis Meggitt, 1931	190	0.9		6 9	
R. sequens sp. nov.	170	1.1	180	7.8 8	Probably lost.
R. torquata var. *rajæ* var. nov.	150	1.4	150	7.7	7-7-9.6

Species.	Testes.		Cirrus sac.	
	Number.	Location.	Size.	Extent.
		mm.	mm.	
R. pseudotriciculata (Fuhrmann, 1909)	6 7 (7 8 Joyeux and Houdemer, 1927; Joyeux and Baer, 1935).		0.112-0.140×0.046 0.060	Not reaching excretory vessel.
R. spiralis (Raczyńska, 1914)	6-7		0.10 long	Do.
R. quadriticulata Meghe, 1925	4	3 aporal, 1 behind ovary (Meggitt: 4 7).	0.158×0.068	Do.
R. torquata (Meggitt, 1924)	8 10	2 poral, 1 behind ovary, rest aporal.	Small	Reaching only to nerve.
R. fimbriata (Meggitt, 1931)	6 9	2 poral, rest aporal	0.11 0.13×0.04-0.06	Reaching excretory vessel.
R. fragilis Meggitt, 1931	8 9	do	0.12×0.06	Not reaching nerve.
R. sequens sp. nov.	5 6	1 2 poral, 3 5 aporal	0.10 0.12×0.04 0.06	Halfway between margin and excretory vessel.
R. torquata var. *rajæ* var. nov.	7 10	1 2 poral, 1-3 behind ovary, 3 6 aporal.	0.14 0.16×0.05-0.07	Almost reaching excretory vessel

Species.	Egg capsules.		Hosts.	Locality.
	Number in each gravid segment.	Number of sets.		
R. pseudistriculata (Fuhrmann, 1909)		6-8	*Calornas nicobarica, Streptopelia orientalis*, etc.	Malay Archipelago, India, Indo-China, etc
R. spiralis (Hsieyeka, 1914)	Few	4-6	*Columba* sp., *Crocopus phoenicopterus*.	New Guinea, India.
R. quadristriculata Moghe, 1925	40-60 (Meggitt, 50–100).	6-8	*Dicrocerus denquebarica, Chalcophaps indica, Treron sieboldi*.	India, Burma.
R. torquata (Meggitt, 1924)	30–40	3-5	*Columba* sp.	Burma.
R. flaminiata (Meggitt, 1931)	16	2-6	*Columba punicea, Ducula aenea*	Do.
R. fragilis Meggitt, 1931	75	4-6	*Columba punicea*	Do.
R. aequens sp. nov.	20-25	2-3	*Streptopelia dussumieri*	Philippines.
R. torquata var. *raja* var. nov.	50-60	2-6	Domestic pigeon	Do.

by 0.7 to 0.9 millimeter. Head about 0.1 millimeter in diameter, separated from the rest of body by a neck 0.75 millimeter long. Rostellum 0.06 millimeter in diameter and about as long, carrying about 180 hammer-shaped hooks 7.6 to 8 microns long, arranged in two alternating rows. Suckers 0.04 millimeter in diameter, devoid of hooks, the latter having probably been lost. Genital pores unilateral, at junction of anterior and middle thirds of lateral margins of segments or slightly behind that level.

Musculature.—The musculature is weakly developed. The longitudinal muscles are represented mostly by solitary muscle fibers and a few bundles of two or three fibers.

Male genitalia.—Testes 5 to 6 in number, 1 to 2 poral and the rest aporal, 55 to 70 microns in diameter. Vas deferens moderately coiled, running in parallel direction with vagina to near median line, and surrounded throughout with intensely staining cells (prostate). Cirrus sac 0.10 to 0.12 by 0.04 to 0.06 millimeter, extending only halfway between ventral longitudinal excretory vessel and poral margin of segment. Seminal vesicle small; cirrus armed with very fine hairs.

Female genitalia.—Ovary median, bilobed, with an expanse of 0.15 millimeter; each ovarian lobe about as large as one of the testes. Vitelline gland behind ovary, subglobular to oval, 50 to 70 microns across. Shell gland small, between ovary and vitelline gland. Vagina opens outside posteriorly to cirrus; its terminal portion is provided with sphincter muscle fibers and its proximal end is wider in diameter and probably functions as a seminal receptacle. Egg capsules 20 to 25 in each gravid segment, confined between longitudinal excretory vessels and each containing 2 to 8 eggs. Eggs 38.4 to 46 by 34.5 to 42 microns; onchospheres 19 to 23 microns in diameter.

Specific diagnosis.—Raillietina (Raillietina): Length 170, maximum breadth 1.1 millimeters. Rostellar hooks 180, 7.6 to 8 microns long. Genital pore in front of middle of proglottis margin. Cirrus sac extending halfway between genital pore and excretory vessel. Testes 5 to 6, 1 to 2 poral and the remainder aporal. Ovary bilobed. Gravid segment with 20 to 25 egg capsules, each containing 2 to 8 eggs 38.4 to 46 by 34.5 to 42 microns; onchospheres 19 to 23 microns in diameter.

Host.—Streptopelia dussumieri.

Location.—Intestine.

Locality.—Makatipo, Rizal, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 320.

RAILLIETINA (RAILLIETINA) TORQUATA (Meggitt, 1924) var. RAJÆ var. nov. Plate 2, fig. 2.

As shown in Table 1, this tapeworm is quite similar to *Raillietina torquata* (Meggitt, 1924), differing from it only in the extent of the cirrus sac, the number of egg capsules in each gravid segment, and the number of eggs in each capsule.

External anatomy.—Maximum length 150, maximum breadth 1.35 millimeters in region of gravid proglottids. Segments broader than long, the longest posterior segments measuring 0.75 to 0.95 by 0.92 to 1.05 millimeters. Head 0.15 to 0.17 millimeter across; neck 1 to 2 millimeters long, depending upon state of contraction of specimen. Rostellum 0.05 to 0.07 by 0.08 to 0.10 millimeter, armed with about 150 characteristic hooks arranged in two alternating rows and measuring 7.7 microns in length. Suckers 0.04 to 0.06 millimeter in diameter, each armed with numerous hooks arranged in five rows and measuring 7.7 to 9.6 microns in length. Genital pores unilateral, near center of proglottid margins.

Musculature.—The muscular system is weakly developed, consisting of a very thin inner layer of circular fibers and a thicker outer layer of longitudinal muscles. The latter occur mostly as solitary fibers, bundles of two or three fibers being few. Dorsoventral fibers are fairly numerous.

Male genitalia.—Testes 7 to 10 (usually 8), 1 to 2 poral, 1 to 3 behind ovary and 3 to 6 aporal; testes subglobular to globular in shape, 50 to 60 microns in diameter. Vas deferens moderately coiled, surrounded throughout by prostatic cells and extending to or slightly beyond median line. Cirrus sac 0.14 to 0.16 by 0.06 to 0.07 millimeter, crossing longitudinal nerve but not quite reaching excretory vessel. Seminal vesicle small; cirrus armed with fine hairs.

Female genitalia.—Ovary bilobed, with smooth surface, median or slightly towards aporal side of median line, with an expanse of 0.15 to 0.20 millimeter. Vitelline gland behind ovary, towards aporal side of median line, subglobular, 0.04 to 0.07 millimeter across. Shell gland small, between ovary and vitelline gland. Vagina opening posteriorly to cirrus, its terminal portion provided with sphincter muscles; near ovary it is slightly swollen, forming a small receptaculum seminis. Egg capsules 50 to 60 in each gravid segment, confined between

longitudinal excretory vessels and each containing 2 to 6 eggs. Eggs 42 to 50 by 38.4 to 42 microns, onchospheres 19 to 23 microns in diameter.

Variety diagnosis.—*Raillietina* (*Raillietina*): Length 150, maximum breadth 1.35 millimeters. Rostellar hooks 150, 7.7 microns long. Hooks on suckers 7.7 to 9.6 microns long. Genital pore near center of proglottis margin. Cirrus sac crossing nerve but not quite reaching excretory vessel. Testes 7 to 10, 1 to 2 poral, 1 to 3 behind ovary and 3 to 6 aporal. Gravid segment with 50 to 60 egg capsules, each containing 2 to 6 eggs. Eggs 42 to 50 by 38.4 to 42 microns, onchospheres 19 to 23 microns in diameter.

Host.—Domestic pigeon.

Location.—Intestine.

Locality.—Manila, P. I.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 513.

Subgenus PARONIELLA Fuhrmann, 1929

RAILLIETINA (PARONIELLA) TINGUIANA sp. nov. Plate 2, figs. 3, 4, and 5.

According to Baer (1931) the subgenus *Paroniella* includes the following cestodes infesting Galliformes: *R. facile* Meggitt, 1926; *R. magninumida* Jones, 1930; *R. numida* (Fuhrmann, 1912); and *R. urogalli* (Modeer, 1790). The Philippine species differs from these in the number of its rostellar hooks, which are 320 compared with 160 in *R. urogalli*, 85 in *R. facile*, 150 to 160 in *R. magninumida*, and 160 to 180 in *R. numida*; and in the number and arrangement of its testes, which are 32 to 44 compared with 130 in *R. urogalli*, 9 to 10 in *R. facile*, 13 to 18 in *R. magninumida*, and 7 to 10 in *R. numida*.

External anatomy.—Maximum length 90, maximum breadth 2.3 millimeters in region of young gravid proglottids. Immature and mature segments broader than long; posterior segments squarish or elongated, the longest measuring 2.0 by 1.7 millimeters. Head 0.28 to 0.38 millimeter in diameter, neck 0.5 millimeter in length. Rostellum 0.07 to 0.08 by 0.09 to 0.10 millimeter, armed with 320 hooks arranged in two rows and measuring 8.5 to 10 microns in length. Suckers 0.095 to 0.115 millimeter in diameter, armed with numerous hooks 7.5 to 9.5 microns long. Genital pores unilateral, at junction of anterior and middle thirds of proglottid margins.

Musculature.—The musculature of this species is moderately well developed with the exception of the circular muscular fibers

which are few and inconspicuous, on account of which the parenchyma is not distinctly divided into cortical and medullary portions. The longitudinal muscles are especially prominent in cross sections of immature segments and consist of an inner layer of larger bundles of fibers and an outer layer of smaller bundles, as well as isolated fibers.

Male genitalia.—Testes 32 to 44 in number, 27 to 30 microns in diameter; they are grouped closely together in the form of a crescentic band behind and on either side of the female glands, about two-thirds of their number being on the aporal side of the median line. Vas deferens much coiled, uniform in diameter, surrounded by prostatic cells throughout its length, extending to near the median line. Cirrus sac relatively small, 0.11 to 0.13 by 0.05 to 0.06 millimeter, not even reaching longitudinal nerve. Seminal vesicle small, cirrus unarmed.

Female genitalia.—Ovary bilobed, median, 0.2 millimeter across. Vitelline gland median, behind ovary, small in mature segments; in segments where the uterus begins to form it becomes a conspicuous organ with a diameter of 0.25 millimeter. Shell gland small, between ovary and vitelline gland. Vagina opens posteriorly to cirrus; it is dilated throughout its length and probably functions as a seminal receptacle. Uterus (Plate 2, fig. 5) becomes recognizable early in the form of intensely staining tubules radiating from a center immediately dorsal to the ovary; at this stage of its development it could be mistaken for a lobulated ovary. The tubules gradually increase in length and then break up into egg capsules each containing a single egg. The egg capsules extend laterally beyond longitudinal excretory vessels. None of the gravid segments examined contained mature eggs.

Specific diagnosis.—*Raillietina* (*Paroniella*) : Length 90, maximum breadth 2.3 millimeters. Rostellum with 320 hooks 8.5 to 10 microns long. Hooks on suckers 7.5 to 9.5 microns long. Genital pore at junction of anterior and middle thirds of proglottis margin. Cirrus sac small, not reaching longitudinal nerve. Testes 32 to 44, grouped closely in the form of a crescentic band behind and on either side of female glands. Ovary bilobed. Egg capsules extending laterally beyond longitudinal excretory vessels.

Host.—Wild chicken (*Gallus gallus*).

Location.—Intestine.

Locality.—Sitio Lumaba, Villaviciosa, Abra, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 169.

RAILLIETINA (PARONIELLA) CIRROFLEXA sp. nov. Plate 2, figs. 1, 2, and 3.

This tapeworm was obtained from a woodpecker. It is naturally more closely related to *Railletina longispina* (Fuhrmann, 1909), *R. cruciata* (Rudolphi, 1819) and *R. rhynchota* (Ransom, 1909), which are also parasites of woodpeckers, than to the other members of the subgenus *Paroniella*. It differs from these, however, in the number and position of its testes and particularly in the appearance of its cirrus sac, which is bent anteriorly in such a way that its main axis is parallel with the proglottis margin.

External anatomy.—Maximum length 20 millimeters, maximum breadth 0.8 millimeter in region of mature and young gravid segments. Immature and mature proglottids wider than long; gravid segments bell-shaped to squarish, the longest among them measuring 0.47 by 0.47 millimeter. Scolex 0.3 millimeter across; neck very short, practically absent. Rostellum 0.08 by 0.15 to 0.20 millimeter in size, armed with about 250 hooks arranged in two rows and measuring 10.4 to 11.5 microns in length. Suckers 0.10 to 0.13 by 0.09 to 0.12 millimeter, armed with numerous deciduous hooks 5.8 to 10.4 microns long. Genital pores unilateral at middle of proglottid margins, each leading into a roomy genital sinus.

Musculature.—The musculature is well developed. The longitudinal muscles are arranged, as in most cestodes, in two layers—an inner layer of large bundles and an outer layer of small bundles of fibers. There are also numerous dorsoventral fibers, but only a few circular fibers.

Male genitalia.—Testes 12 to 15, measuring 30 to 35 by 38 to 44 microns, grouped closely together on each side of, and behind, female glands. Vas deferens with several coils, uniform in diameter, extending transversely to near median line and surrounded by prostatic cells. Cirrus sac relatively large, 0.10 to 0.12 by 0.06 to 0.07 millimeter in size; from the genital pore it is directed posteromesially and then bends suddenly in an anterior direction in such a way that the main axis of the organ is parallel with the proglottis margin. A distinct seminal vesicle is not discernible within the cirrus sac; cirrus unarmed.

Female genitalia.—Ovary median, very small, 0.08 millimeter across, consisting of a few follicles arranged fanwise. Vitelline gland with indented margins 0.04 to 0.08 millimeter across,

small in mature segments, attaining its maximum size in young gravid segments. Shell gland as large as vitelline gland, between latter and ovary. Vagina opens posteriorly to cirrus, its proximal end slightly swollen into a seminal receptacle. Uterus appears early in the form of tubules radiating from a center dorsal to the ovary (Plate 3, fig. 3). Egg capsules extend laterally beyond longitudinal excretory vessels, and each contains a single egg. Eggs 57 to 71 by 31 to 38.5 microns, onchospheres 17 to 19 by 15 microns.

Specific diagnosis.—*Railletina* (*Paroniella*): Length 20 millimeters, maximum width 0.8 millimeter. Rostellar hooks 250, 10.4 to 11.5 microns long. Hooks on suckers 5.8 to 10.4 microns long. Genital pore at middle of proglottis margin; genital sinus roomy. Testes 12 to 15, grouped closely together, almost surrounding female glands. Cirrus sac acutely bent anteriorly, its main axis parallel with proglottis margin. Ovary very small, lobulated. Eggs 57 to 71 by 31 to 38.5, onchospheres 17 to 19 by 15 microns.

Host.—*Lichtensteinipicus funebris.*

Location.—Intestine.

Locality.—Bahi, Sipocot, Camarines Sur, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 330.

RAILLIETINA (PARONIELLA) CORONEA sp. nov. Plate 3, fig. 7.

This is a common parasite of the Philippine crow and appears most closely related to *Railletina corvina* (Fuhrmann, 1905) and *R. reynoldsæ* Meggitt, 1926, which have been reported from crows in India and Ceylon and in Burma, respectively. It differs from them in the extreme anterior position of the genital pore on the proglottis margin, the greater number of testes and the structure of the ovary and vitelline gland in fully mature segments (Table 2).

External anatomy.—Maximum length 250, maximum width 3.3 millimeters in region of young gravid segments. Proglottids much wider than long except most posterior ones, which are squarish and measure 1.35 to 1.65 by 1.75 to 2.00 millimeters. Head 0.45 millimeter across, neck 0.8 millimeter long. Rostellum 0.11 to 0.13 by 0.15 to 0.17 millimeter, carrying about 200 hooks arranged in two rows and measuring 15.3 to 17.3 microns in length, those of the second row being smaller. Suckers 0.10 to 0.12 millimeter in diameter, armed with hooks arranged in five to six rows and measuring 7.7 to 15.5 microns in

length, their size diminishing towards center of suckers. Genital pores unilateral, at anterior fourth or fifth of proglottid margins.

Musculature.—The musculature is moderately well developed. As usual, there is a layer of larger bundles of longitudinal fibers immediately adjoining the medullary parenchyma and smaller bundles as well as isolated fibers interspersed between the larger bundles and beneath the subcuticula where they are especially numerous. The dorsoventral fibers are also prominent, the circular ones less so.

Male genitalia.—Testes 44 to 46 in number, 60 to 75 microns across, arranged in two unequal groups on each side of ovary, 12 to 16 being poral and 30 to 32 aporal. Cirrus sac small, 0.13 to 0.14 by 0.05 to 0.06 millimeter, extending halfway between proglottis margin and longitudinal nerve. Vas deferens uniform in diameter, with numerous but short coils, running almost parallel to and in front of vagina to near median line; it is surrounded by a few prostatic cells. Seminal vesicle moderately developed; cirrus short and unarmed.

Female genitalia.—Ovary median, much lobulated, its component lobules arranged fanwise; in fully mature segments it attains a maximum transverse diameter of 0.9 millimeter. Vitelline gland also lobulated, immediately behind ovary, 0.3 millimeter across in the fully developed stage. Shell gland small, between ovary and vitelline gland. Vagina opens posteriorly to cirrus; one-half of its length, that is, that portion between the genital pore and the ventral excretory vessel is small in diameter and surrounded by prominent cells, while the other half is thin-walled and swollen and probably functions as a seminal receptacle. Uterus breaks up into egg capsules, each containing a single egg and extending laterally beyond principal excretory vessels to subcuticula. Eggs 34.5 to 42.2 by 30.7 to 36.5, onchospheres 17.3 to 19.2 by 15.4 microns.

Specific diagnosis.—*Raillietina* (*Paroniella*): Length 250, maximum width 3.3 millimeters. Rostellum with 250 hooks 15.3 to 17.3 microns long. Hooks on suckers 7.7 to 15.5 microns long. Genital pore on anterior fourth or fifth of proglottis margin. Testes 44 to 46, 12 to 16 poral and 30 to 32 aporal. Ovary and vitelline gland lobulated. Eggs 34.5 to 42.2 by 30.7 to 36.5, onchospheres 17.3 to 19.2 by 15.4 microns.

Host.—*Corone philippina.*

Location.—Intestine.

Locality.—Novaliches, Rizal, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 120.

RAILLIETINA (PARONIELLA) CULIAUANA sp. nov. Plate 3, fig. 6.

According to the available literature, there is only one member of the subgenus *Paroniella* which has been recorded from orioles; namely, *R. compacta* (Clerc, 1906). As described by Ransom (1909), this species differs from the Philippine parasite in its larger number of rostellar hooks, the smaller number and the arrangement of the testes, and the smaller size of the onchospheres. As a matter of fact *R. culiauana* appears more closely related to the *Paroniella* species reported from crows as well as to one other parasite described below (*R. balbularum* sp. nov.) which was obtained from another passeriform bird. The distinguishing features of these various tapeworms are given in Table 2.

External anatomy.—Maximum length 150, maximum diameter 3.3 millimeters in region of young gravid segments. Proglottids much wider than long, the most posterior ones, which are trapezoidal, measuring 0.75 to 0.85 by 1.70 to 1.95 millimeters. Head about 0.45 millimeter across, neck at least 1 millimeter long. Rostellum 0.10 by 0.17 millimeter in size, with about 300 hooks arranged in two rows and measuring 15.3 to 18 microns in length. Suckers 0.15 to 0.17 millimeter in diameter, with numerous deciduous hooks 9.6 to 13.4 microns long. Genital pores unilateral, at junction of anterior and middle thirds of proglottid margins or slightly behind that level.

Male genitalia.—Testes 30 to 33, oval, 65 to 88 by 60 to 77 microns in size, arranged in two unequal groups on each side of female organs, 9 to 10 poral and 21 to 23 aporal. Vas deferens with numerous coils, uniform in diameter, extending transversely to near median line and surrounded by prostatic cells. Cirrus sac very prominent, 0.13 to 0.16 by 0.08 to 0.09 millimeter, almost reaching ventral longitudinal excretory vessel. A distinct seminal vesicle not apparent; cirrus long and coiled, unarmed.

Female genitalia.—Ovary median, asymmetrically bilobed, 0.20 to 0.24 millimeter across, each lobe distinctly lobulated. Vitelline gland behind and in contact with ovary, transversely oval to elongate, reaching a maximum diameter of 95 microns in young gravid segments. Shell gland between ovarian lobes. Vagina opening posteriorly to cirrus, swollen for the greater

TABLE 2.—*Comparison of closely related species of Raillietina (Paroniella) parasitic in Passeriformes.*

Species.	Size.		Rostellar hooks.		Length of hooks on suckers.	Testes.	
	Length.	Maximum width.	Number.	Length.		Number.	Location.
	mm.	mm.		μ	μ		
R. compacta (Clerc, 1906)	150	1.3	460	15	10	25	
R. cesonia (Fuhrmann, 1905)	120	2-3	80	16–18	9	26–34	In two groups, one on each side of ovary.
R. reynoldsi Meggitt, 1928	250	3	250	11–17		33–39?	7–12 poral, 26–27 aporal.
R. cesonia sp. nov.	250	3.2	200	15.3–17.3	7.7–15.5	44–45	12–16 poral, 29–32 aporal.
R. culiquana sp. nov.	160	3.3	300	15.3–18	9.6–13.4	30–33	9–10 poral, 21–23 aporal.
R. bulbiformis sp. nov.	70	1.6	190	20–23	11.5–15.3	26–30	8–10 poral, 18–20 aporal.

Species.	Cirrus sac.		Position of genital pore.	Ovary.	Hosts.	Locality.
	Size.	Extent.				
	mm.					
R. compacta (Clerc, 1906)	0.15 long.				*Oriolus galbula*, *O. auratus*, *Pyromelana franciscana*.	Ural, Ahomey.
R. cesonia (Fuhrmann, 1905)	0.13×0.04	One-third distance between margin and nerve.	Near middle of proglottis margin.	Lobulated, lobules arranged fanwise.	*Crecca querquedula*, *C. crecca*, etc.	India, Ceylon, Siam, Australia.
R. reynoldsi Meggitt, 1926	0.13–0.21 long.	Crossing nerve, not reaching excretory vessel.	Anterior third of proglottis margin.	Much lobed	*Corvus splendens*, *C. levaillanti*.	Burma.
R. cesonia sp. nov.	0.13–0.14×0.05–0.06.	Halfway between proglottis margin and nerve.	Anterior fourth or fifth of proglottis margin.	Lobulated, lobules arranged fanwise.	*Corvus philippinus*.	Philippines.
R. culiquana sp. nov.	0.13–0.16×0.05–0.09.	Almost reaching excretory vessel.	Anterior third of proglottis margin.	Bilobed, lobulated.	*Oriolus xanthonotus*.	Do.
R. bulbiformis sp. nov.	0.13–0.15×0.06–0.07.	Reaching nerve.	do	do	*Pycnonotus goiavier*.	Do.

part of its length into a seminal receptacle. Egg capsules containing each a single egg and extending laterally beyond longitudinal excretory vessels to near subcuticula. Eggs measure 38.5 to 46 by 34.5 to 38.5, onchospheres 21 to 23 by 19.2 microns.

Specific diagnosis.—*Raillietina* (*Paroniella*): Length 150, maximum width 3.3 millimeters. Rostellum with 300 hooks, 15.3 to 18 microns long. Hooks on suckers 9.6 to 13.4 microns long. Testes 30 to 33, on each side of female glands, 9 to 10 poral, 21 to 23 aporal. Ovary asymmetrically bilobed and lobulated. Eggs 38.5 to 46 by 34.5 to 38.5, onchospheres 21 to 23 by 19.2 microns.

Host.—*Oriolus acrorhynchus.*

Location.—Intestine.

Locality.—Palo, Leyte.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 155.

RAILLIETINA (PARONIELLA) BULBULARUM sp. nov. Plate 3, figs. 4 and 5.

As shown in Table 2, this species is quite similar to *Raillietina culianana*, from which it differs in the number and size of the rostellar hooks and the extent of the cirrus sac in relation to the ventral longitudinal excretory vessel.

External anatomy.—Maximum length 70, maximum width 1.5 millimeters in region of gravid segments. Proglottids wider than long, the most posterior ones the longest, measuring 0.65 to 0.75 by 1.35 to 1.50 millimeters. Head 0.5 millimeter across, neck at least 1 millimeter long. Rostellum 0.07 to 0.08 by 0.15 to 0.17 millimeter, with 120 to 130 hooks arranged in two rows and measuring 20 to 23 microns in length. Suckers 0.11 to 0.13 by 0.09 to 0.11 millimeter in size, armed with numerous hooks 11.5 to 15.3 microns long and arranged in 7 to 8 rows. Genital pores unilateral, at junction of anterior and middle thirds of lateral margins of proglottids.

Male genitalia.—Testes 26 to 30 in number, 42 to 62 microns in diameter, arranged in two unequal groups on each side of female glands, 8 to 10 being poral and 18 to 20 aporal. Vas deferens very much coiled, uniform in diameter, reaching median line, and surrounded by few prostatic cells. Cirrus sac 0.13 to 0.15 by 0.06 to 0.07 millimeter, just reaching longitudinal nerve; incloses elongate seminal vesicle and unarmed cirrus.

Female genitalia.—Ovary median, 0.15 to 0.20 millimeter across, consisting of two lobulated wings. Vitelline gland behind ovary, 0.07 to 0.13 millimeter across, attaining its maximum size in young gravid segments. Shell gland small, between

wings of ovary. Vagina opens immediately behind cirrus; approximately one-half of its length, or that portion internal to ventral longitudinal excretory vessel, is thin-walled and slightly swollen and probably functions as a seminal receptacle, while the other half is thick-walled and surrounded by prominent cells. Egg capsules, each containing a single egg, extend laterally beyond longitudinal excretory vessels to near subcuticula. No mature eggs were seen.

Specific diagnosis.—*Raillietina* (*Paroniella*): Length 70, maximum width 1.5 millimeters. Rostellum with 120 to 130 hooks, 20 to 23 microns long. Hooks on suckers 11.5 to 15.3 microns long. Testes 26 to 30, on each side of female glands, 8 to 10 poral, 18 to 20 aporal. Ovary bilobed and lobulated.

Host.—*Pycnonotus goiavier.*

Location.—Intestine.

Locality.—Novaliches, Rizal, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 144.

Genus COTUGNIA Diamare, 1893

COTUGNIA ILOCANA sp. nov. Plate 4, figs. 1 and 2.

This species most closely resembles *Cotugnia meggitti* Yamaguti, 1935 (= *C. cuneata* var. *nervosa* Meggitt, 1924). It may be distinguished from the latter by its smaller rostellar hooks, the more numerous testes, the extent of the cirrus pouch, and the size of the eggs and onchospheres.

External anatomy.—Greatest length 60, maximum width 3.9 millimeters in region of gravid segments. All proglottids broader than long. Head 0.70 to 0.76 millimeter across, neck 0.4 millimeter long. Rostellum 0.18 to 0.21 by 0.30 to 0.32 millimeter, armed with about 320 hooks arranged in two rows and measuring 11.5 to 15.3 microns in length, the hooks of the second row being smaller. Suckers 0.16 to 0.20 millimeter in diameter, unarmed. Genital pores bilateral, at about middle of lateral margins of proglottids.

Musculature.—The muscular system is well developed, the longitudinal muscles arranged in three layers, each layer limited internally by a few strands of transverse fibers. Inner layer represented by about twenty-five large bundles on each surface (total fifty) of a segment, each bundle containing about fifty fibers. In the middle layer the bundles are more numerous but smaller, containing only a maximum of ten fibers each. Outer

layer very near the subcuticula and composed of isolated fibers and small bundles of two to five fibers each. There are also a few dorsoventral muscle fibers.

Male genitalia.—Testes 80 to 100 in number, 57 to 77 microns in diameter, grouped together usually in the form of a continuous band in the posterior half of the segment behind the ovaries and extending laterally beyond the ventral longitudinal excretory vessels; the band is 2 to 4 testes deep anteroposteriorly. In well-expanded segments the testes may be divided into two lateral groups on each side of median line. Vas deferens with few fine coils, uniform in diameter, extending to in front of corresponding ovary, surrounded by small prostatic cells. Vas deferens and vagina passing dorsally to ventral longitudinal excretory vessel. Cirrus sac small, 0.19 to 0.22 by 0.05 to 0.06 millimeter, extending to one half or two thirds the distance between margin of segment and excretory vessel. Cirrus unarmed.

Female genitalia.—Ovary bilobed, 0.15 to 0.26 millimeter across, lying closely against corresponding ventral excretory vessel; each lobe composed of a few follicles. Vitelline gland follicular, 0.05 to 0.07 millimeter across, behind ovary. Shell gland small, between ovary and vitelline gland. Vagina short, opening posteriorly to cirrus, its proximal end dilated into a small seminal receptacle. Egg capsules, each containing a single egg, extending laterally beyond excretory vessels and lying very close to subcuticula. Eggs 50 to 60 by 42 to 50 microns, onchospheres 27 to 30 microns in diameter.

Specific diagnosis.—*Cotugnia*: Length 60, maximum breadth 3.9 millimeters. Rostellum with 320 hooks, 11.5 to 15.3 microns long. Testes 80 to 100, usually in one continuous band in posterior half of segment, rarely in two lateral groups. Ovary small, lobulated. Receptaculum seminis present. Eggs 50 to 60 by 42 to 50 microns, onchospheres 27 to 30 microns in diameter.

Host.—*Streptopelia dussumieri.*

Location.—Intestine.

Locality.—Sitio Lumaba, Villaviciosa, Abra, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 512.

COTUGNIA RIMANDOI sp. nov. Plate 4, fig. 3.

This tapeworm is related to *Cotugnia digonophora* (Pasquale, 1890), *C. crassa* Fuhrmann, 1909, *C. pluriuncinata* Baer, 1925, *C. noctua* Johri, 1934, and *C. taiwanensis* Yamaguti, 1935, in

possessing a large number of testes. It differs from these various species in the large size of the rostellar hooks.

External anatomy.—Greatest length 70, maximum breadth 3.8 millimeters in region of gravid segments. All proglottids wider than long. Head 0.50 to 0.57 millimeter across; neck very short. Rostellum 0.25 by 0.23 millimeter, armed with about 300 hooks 20 to 23 microns long and arranged in two alternating rows. Suckers 0.14 to 0.17 millimeter in diameter, unarmed. Genital pores bilateral, in front of middle of lateral margins of proglottids.

Musculature.—The muscular system is poorly developed. Only two layers of longitudinal muscles are present—an inner layer consisting of a single row of small bundles of fibers and a thick outer layer of single fibers that extend to near the subcuticle. Dorsoventral and transverse fibers are few and weak.

Male genitalia.—Testes 100 to 136 in number, 40 to 42 microns in diameter, in one continuous band in posterior half of segment and extending laterally beyond excretory vessels; the band is 3 to 6 testes deep anteroposteriorly. Vas deferens with few short coils, uniform in diameter, extending to in front of corresponding ovary and surrounded by small prostatic cells. Cirrus sac 0.17 to 0.28 by 0.05 to 0.06 millimeter, just reaching to excretory vessel. Cirrus not coiled, unarmed.

Female genitalia.—Ovary crescentic, 0.19 to 0.30 millimeter across, composed of lobules arranged fanwise; it is separated by a clear space from corresponding ventral excretory vessel. Vitelline gland large, 0.08 to 0.13 millimeter across, behind ovary. Shell gland small, between ovary and vitelline gland. Vagina short, opening posteriorly behind cirrus; just before reaching shell gland it is slightly dilated to form a small receptaculum seminis. Egg capsules, containing a single egg each, extending laterally beyond excretory vessels. Eggs 73.0 to 84.5 by 57.6 to 69.0 microns, onchospheres 29.0 to 30.7 microns in diameter.

Specific diagnosis.—Cotugnia: Length 70, maximum width 3.8 millimeters. Rostellum with 300 hooks, 20 to 23 microns long, arranged in two rows. Testes 100 to 136, in a single band 3 to 6 testes deep anteroposteriorly. Cirrus sac 0.17 to 0.28 by 0.05 to 0.06 millimeter, just reaching to excretory vessel. Ovary crescentic, lobulated. Receptaculum seminis present. Eggs 73.0 to 84.5 by 57.6 to 69.0 microns, onchospheres 29.0 to 30.7 microns in diameter.

Host.—Domestic pigeon.
Location.—Intestine.
Locality.—Manila, Philippines.
Type specimens.—Philippine Bureau of Science parasitological collection, No. 172.

Family HYMENOLEPIDIDÆ Railliet and Henry, 1909

Genus HYMENOLEPIS Weinland, 1858

HYMENOLEPIS CORONOIDIS sp. nov. Plate 5, figs. 1, 2, 3, and 4.

This parasite of the Philippine crow resembles *Hymenolepis farciminosa* (Goeze, 1782), as reported by Meggitt (1926) from *Acridotheres tristis* in Rangoon, and by Southwell (1930) from *Corvus macrorhynchus* in Calcutta, in so many details that it is a question as to whether it should be considered as an independent species or only a varietal form. The only constant differences between the two are in the size of the worms, the Philippine form being shorter but wider, and in the shape of the rostellar hooks (Plate 5, figs. 2 and 5). Another feature of *H. coronoidis* which has not been given for *H. farciminosa* even by Rosseter (1908), who described the parasite very minutely, is the presence of threadlike processes arising from each pole of the onchosphere.

External anatomy.—Greatest length 160, maximum width 1.8 millimeters in region of gravid segments. Proglottids wider than long except the most posterior ones which are squarish. Head 0.35 millimeter across, neck 0.4 to 0.6 millimeter long. Rostellum 0.08 by 0.08 millimeter in size, armed with a single row of ten hooks 20 microns long and possessing a blade much shorter than either of the two roots. Rostellar sac extends to level of posterior border of suckers. Suckers 0.10 to 0.12 millimeter in diameter, unarmed. Genital pores unilateral, at middle of proglottis margin or slightly in front of that level.

Male genitalia.—Testes three (rarely four), subglobular to oval, 0.17 to 0.23 by 0.20 to 0.26 millimeter in size, and arranged as follows: one poral and two aporal, of which one is directly in front of, or anterior and slightly external to, the other. In certain cases there is no poral testis, the organs being concentrated on the aporal side of the segment. In proglottids with four testes, one or two are poral and the rest aporal. Cirrus sac 0.24 to 0.27 by 0.050 to 0.065 millimeter, barely extending to, and in some segments slightly beyond, the ventral longitudinal excretory vessel. Internal seminal vesicle small, cirrus short

and unarmed. External seminal vesicle not conspicuous and not crossing median line.

Female genitalia.—Ovary 0.4 to 0.5 millimeter across, bilobed, each lobe almost rounded and smooth in young mature segments; in older segments it assumes an irregular shape. Vitelline gland 0.10 to 0.15 millimeter across, immediately behind ovary. Shell gland small, between ovary and vitelline gland. Vagina opening posteriorly to cirrus and running almost parallel with cirrus pouch, passing with the latter dorsally to longitudinal excretory vessels; it is enlarged in diameter in several places along its course towards the ovary, thus probably serving as receptaculum seminis at the same time. Uterus partly septate, confined between longitudinal excretory vessels. Eggs oval, with two shells; outer shell measures 78.7 to 103.7 by 65.3 to 96 microns; inner shell 36.4 to 41 by 27 to 31.5 microns, thickened at each pole, from which arise numerous threadlike processes that unite into a tangled mass around the onchosphere. Embryonal hooks 18 to 20 microns long.

Specific diagnosis.—Hymenolepis: Length 160, maximum width 1.8 millimeters. Rostellum with one row of ten hooks 20 microns long, with blade much shorter than either of two roots; rostellar sac extending posteriorly to posterior border of suckers. Testes three (rarely four), one (rarely two) poral and the rest aporal. One aporal testis directly in front of, or anterior and slightly external to, the other. Cirrus pouch 0.24 to 0.27 by 0.050 to 0.065 millimeter in size, sometimes reaching slightly median to excretory vessel. Ovary at first symmetrically bilobed, later assuming an irregular shape. Outer shell of eggs 78.7 to 103.7 by 65.3 to 96, inner shell 36.4 to 41 by 27 to 31.5 microns. Inner shell with threadlike processes arising from its two polar thickenings.

Host.—Corone philippina.

Location.—Intestine.

Locality.—Palo, Leyte.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 162.

HYMENOLEPIS PYCNONOTI sp. nov. Plate 4, figs. 4, 5, and 6.

This species is represented by a single specimen from the intestine of a guava bulbul. It bears some resemblance to *H. coronoidis*, as described above, as well as to *H. farciminosa* (Goeze, 1782) and *H. planestici* Mayhew, 1925. It differs from *H. coronoidis* in the shape of the segments, the rostellar hooks, and ovary, and in the structure of the eggs; from *H. farciminosa*

in the shape of the segments and the ovary, and in the position of the genital pores; and from *H. planestici* in the size of the hooks and the position of the genital pores.

External anatomy.—Length 45, maximum breadth 2 millimeters in region of gravid segments. All proglottids very much wider than long. Head 0.20 by 0.30 millimeter; neck practically absent. Rostellum very small, 0.09 by 0.05 millimeter in size, with a single row of ten hooks 19 microns long, their blades as long as either of the two roots. Suckers 0.10 millimeter across, unarmed. Genital pores unilateral, at anterior third or fourth of lateral margins of segments. A small genital sinus present.

Male genitalia.—Testes three (one poral, two aporal), transversely oval, 0.04 to 0.07 by 0.06 to 0.12 millimeter in size; one aporal testis anterior and slightly external to its fellow. Occasionally only two testes are present, one on each side of ovary. Cirrus sac measures 0.26 to 0.30 by 0.05 to 0.08 millimeter, one fourth to one third of its length reaching mesially beyond longitudinal excretory vessels. External seminal vesicle about as long as cirrus sac, not crossing median line. Internal seminal vesicle prominent; cirrus short, unarmed.

Female genitalia.—Ovary 0.21 to 0.45 millimeter across, lobulated, the lobules arranged fanwise. Vitelline gland also lobulated, behind and in contact with ovary. Shell gland small, dorsal to ovary. Vagina short, opening posteriorly to cirrus; receptaculum seminis small, not reaching mesially as far as external seminal vesicle. Uterus partly septate, limited between longitudinal excretory vessels. Eggs oval, with two shells: outer shell 57.6 to 76.8 by 50 to 54, inner shell 27 to 30.7 by 25 to 27 microns; embryonal hooks 19 microns long.

Specific diagnosis.—*Hymenolepis*: Length 45, maximum width 2 millimeters. Rostellar hooks ten, 19 microns long, the blades and roots about equal in length. One aporal testis usually anterior and slightly external to its fellow. Cirrus sac 0.26 to 0.30 by 0.05 to 0.08 millimeter, one fourth to one third of its length crossing excretory vessels. Ovary and vitelline gland lobulated. Eggs (outer shell) measure 57.6 to 76.8 by 50 to 54, inner shell 27 to 30.7 by 25 to 27 microns; embryonal hooks 19 microns long.

Host.—*Pycnonotus goiavier.*

Location.—Intestine.

Locality.—Sipocot, Camarines Sur, Luzon.

Type specimen.—Philippine Bureau of Science parasitological collection, No. 335.

HYMENOLEPIS sp. Plate 6, figs. 1 and 2.

This is represented by two complete but poorly preserved specimens (No. 514) from the Philippine bulbul, *Iole gularis*. In view of the absence of rostellar hooks in both sets of proglottids, a definite identification has not been attempted.

External anatomy.—Length 50, maximum width 1.2 millimeters in region of gravid segments. Proglottids wider than long, the shape being trapezoidal. Head 0.5 to 0.6 millimeter across; neck very short, practically absent. Rostellum 0.22 by 0.10 millimeter in size, devoid of hooks, which probably were lost. Suckers 0.20 to 0.23 millimeter across, unarmed. Genital pores unilateral, in anterior third of lateral margins of segments or a little behind that level.

Male genitalia.—Testes three, oval to round, 0.07 to 0.09 by 0.06 to 0.09 millimeter, one poral and two aporal; one aporal testis anterior and median to its fellow. Cirrus sac 0.15 to 0.19 by 0.04 to 0.05 millimeter, about one half of its length across ventral excretory vessel. External vesicula seminalis small, rounded.

Female genitalia.—Ovary fan-shaped, lobulated, 0.13 to 0.20 millimeter across. Vitelline gland large and prominent, immediately behind ovary. Vagina opening posteriorly to cirrus; in the region of the ovary it forms a small receptaculum seminis. Uterus saclike, partly septate, not extending laterally beyond longitudinal excretory vessels. Eggs with two shells; outer shell 46.0 to 57.6 by 42.2 to 50.0 microns, inner shell 27.0 to 34.5 by 30.7 microns. Embryo 23 to 26 microns across; embryonal hooks 15 to 17 microns long.

Host.—*Iole gularis*.

Location.—Intestine.

Locality.—Novaliches, Rizal, Luzon.

Genus FUHRMANNIELLA Tseng, 1933

FUHRMANNIELLA CLERCI Tseng, 1933. Plate 5, figs. 6, 7, and 8.

Our specimens of this parasite (No. 296) were obtained from the same type of host as those studied by Tseng (1933). They tally well with Tseng's description except that the rostellar hooks are bigger, being 32.5 to 34.5 microns long. In Tseng's specimens they are 27 to 28.8 microns long.

Host.—*Rostratula capensis*.

Location.—Intestine.

Locality.—Novaliches, Rizal, Luzon.

Genus DIORCHIS Clerc, 1903

DIORCHIS VISAYANA sp. nov. Plate 7, figs. 1, 2, and 3.

Compared with the members of the genus *Diorchis* described and listed by Mayhew, 1929, and *D. nyrocæ* Yamaguti, 1935, this parasite most closely resembles *D. acuminata* (Clerc, 1902), but differs from it in its fewer but larger rostellar hooks, longer cirrus sac, and shape of ovary.

External anatomy.—Greatest length 120 millimeters, maximum width 1.0 millimeter in region of gravid segments. All proglottids wider than long. Head 0.32 millimeter across, neck 0.3 millimeter long. Rostellum 0.16 to 0.18 by 0.08 to 0.09 millimeter, carrying near its tip one row of eight hooks 48 to 50 microns long. Rostellar sac reaches well behind posterior level of suckers. Suckers 0.12 to 0.14 by 0.10 millimeter, unarmed. Genital pores unilateral, at middle of lateral margins of proglottids.

Musculature.—As in other species of *Diorchis*, there are two conspicuous layers of longitudinal muscles, an outer layer composed of numerous small bundles of fibers and an inner layer of eight larger bundles. The other muscle fibers are poorly developed.

Male genitalia.—Testes two, side by side, behind and dorsal to ovary, 0.042 to 0.058 by 0.075 to 0.094 millimeter. Vas deferens short, swollen for the most part into a roundish external seminal vesicle. Cirrus sac elongate, 0.28 to 0.40 by 0.027 to 0.038 millimeter, reaching slightly beyond median line, the greater part of its length occupied by internal seminal vesicle. Cirrus slender, unarmed, 0.080 to 0.096 millimeter long, with a globular swelling at its base 19 to 23 microns in diameter.

Female genitalia.—Ovary median, subglobular to oval, 0.05 to 0.07 by 0.06 to 0.09 millimeter. Vitelline gland prominent, behind and overlapping ovary. Shell gland small, dorsal to ovary. Vagina opens posteriorly to cirrus; after crossing ventral excretory vessel it becomes enormously swollen into a large receptaculum seminis. Uterus a simple sac, nonseptate, extends laterally beyond longitudinal excretory vessels. Eggs elongate, outer shell measuring 57.6 to 73 by 23 to 29, and the inner shell 38.4 to 42.2 by 15.4 to 19.2 microns.

Specific diagnosis.—*Diorchis:* Length 120, maximum breadth 1.0 millimeter. Rostellar hooks eight, 48 to 50 microns long. Cirrus sac crosses median line. Cirrus unarmed, 80 to 96

microns long, with a bulbous swelling at base 19 to 23 microns in diameter. Ovary smooth, subglobular to oval. Outer shell of egg measures 57.6 to 73 by 23 to 29, inner shell 38.4 to 42.2 by 15.4 to 19.2 microns.

Host.—*Gallinula chloropus.*

Location.—Intestine.

Locality.—Palo, Leyte.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 149.

Genus HAPLOPARAXIS Clerc, 1903

HAPLOPARAXIS SANJUANENSIS sp. nov. Plate 4, figs. 7, 8, and 9.

This parasite may be distinguished from the members of the genus *Haploparaxis* listed by Tseng (1933) and by Yamaguti (1935) by the size of its rostellar hooks, which are intermediate between those of *H. diminuens* v. Linstow and *H. clerci* Yamaguti; the length of its cirrus pouch, which extends to or just beyond the excretory vessel; and the size of the eggs.

External anatomy.—Greatest length 100, maximum width 1.1 millimeters in region of gravid segments. All proglottids wider than long. Head 0.25 millimeter across, neck 0.4 to 0.6 millimeter long. Rostellum 0.08 to 0.09 by 0.03 to 0.04 millimeter, armed at its tip with a single row of ten hooks 16.5 to 17.5 microns long. Rostellar sac 0.2 millimeter long, extending posteriorly to behind level of suckers. Suckers 0.10 to 0.12 millimeter across, unarmed. Genital pores unilateral, usually behind middle of lateral margins of segments.

Male genitalia.—Testis single, behind and dorsal to ovary, median, slightly oval, 0.07 to 0.09 by 0.08 to 0.12 millimeter. External seminal vesicle pyriform, not crossing median line. Cirrus sac elongate, 0.19 to 0.22 by 0.023 to 0.027 millimeter, extending to or just crossing ventral longitudinal excretory vessel. Internal seminal vesicle occupying one half of length of cirrus sac. Cirrus short, unarmed, slightly swollen at its tip.

Female genitalia.—Ovary in front of middle and slightly towards poral side of segment, transversely elongate, 0.14 to 0.17 millimeter across, with a slight constriction at middle. Vitelline gland behind and in contact with ovary, 0.04 to 0.05 by 0.03 to 0.04 millimeter, also towards poral side of segment. Shell gland small, between ovary and testis. Vagina opening posteroventrally to cirrus; before reaching excretory vessel, it becomes

swollen into a roundish or oval receptaculum seminis which does not extend mesially as far as external seminal vesicle. Receptaculum seminis as well as male genital canals passes dorsally to longitudinal excretory vessels. Uterus partly septate, extends laterally beyond excretory vessels. Eggs with three shells: outer shell variable in shape and size; middle shell lemon-shaped and plugged at each pole, 46 to 57.6 by 38.5 to 50 microns; inner shell rounded, 38.5 to 40 microns across. Embryo 28.8 to 30 microns in diameter; embryonal hooks 16 to 19 microns long.

Specific diagnosis.—Haploparaxis: Length 100, maximum width 1.1 millimeters. Rostellar hooks ten, 16.5 to 17.5 microns long. Cirrus sac 0.19 to 0.22 by 0.023 to 0.027 millimeter, extending to or just passing excretory vessel. Ovary transversely elongate, constricted at middle. Eggs with three shells: outer shell variable in shape and size; middle shell lemon-shaped, plugged at both ends, 46 to 57.6 by 38.5 to 50 microns, inner shell round, 38.5 to 40 microns across; embryo 28.8 to 30 microns across, embryonal hooks 16 to 19 microns long.

Host.—Gallinago megala.

Location.—Intestine.

Locality.—San Juan, Rizal, Luzon.

Type specimens.—Philippine Bureau of Science parasitological collection, No. 121.

Family DILEPIDIDÆ Fuhrmann, 1907

Genus KOWALEWSKIELLA Baczyñska, 1914

KOWALEWSKIELLA BUZZARDIA sp. nov. Plate 6, figs. 3, 4, 5, and 6.

The material available for description consists of a single set of proglottids obtained from a tic-wee buzzard. The anatomical features of the parasite agree with the definition of the genus *Kowalewskiella*, as given by Meggitt (1924), but we have been unable to make any comparison with the type species of the genus due to the inaccessibility of Baczyñska's paper.

External anatomy.—Length 160, maximum width 1.9 millimeters in region of young gravid segments. Proglottids trapezoidal, wider than long, the longest posterior segments measuring 0.60 to 0.70 by 1.40 to 1.90 millimeters. Head 0.47 by 0.40 millimeter, neck about 2.5 millimeters long. Rostellum 0.10 by 0.13 millimeter in size, armed with a single crown of ten hooks possessing well-developed blades and long dorsal and short ventral roots and measuring 61 to 65 microns in length. Suckers

weak, 0.12 millimeter across. Genital pores irregularly alternate, at junction of anterior and middle thirds of lateral margins of segments or slightly in front of that level.

Male genitalia.—Testes disclike, 65 to 70 microns across, 20 behind, and 10 in front of left lobe of ovary (total 30). Vas deferens extensively coiled, uniform in diameter, surrounded by prostatic cells and reaching beyond median line. Cirrus sac well developed, 0.40 by 0.10 millimeter, more than one half of its length lying internally to ventral longitudinal excretory vessel. Cirrus sac and vagina pass between dorsal and ventral longitudinal excretory vessels. A distinct vesicula seminalis is absent; cirrus long, coiled, and armed with spines.

Female genitalia.—Ovary large, bilobed, with indented margins, 0.75 to 0.95 millimeter across and extending from one ventral longitudinal excretory vessel to the other. Vitelline gland 0.20 to 0.28 millimeter across, behind and in contact with ovary. Vagina opens posteriorly to cirrus, its proximal portion enlarged into a receptaculum seminis. Uterus a transverse sac, lobed, confined between ventral longitudinal excretory vessels. No mature eggs seen.

Host.—*Butastur indicus.*

Location.—Intestine.

Locality.—Palo, Leyte.

Type specimen.—Philippine Bureau of Science parasitological collection, No. 164.

Family ACOLEIDÆ Ransom, 1909

Genus GYROCŒLIA Fuhrmann, 1899

GYROCŒLIA PARADOXA (Linstow, 1906). Plate 7, figs. 4, 5, 6, and 7.

In spite of certain morphological features that do not tally with the description of von Linstow (1906), we have referred to this species a single poorly preserved specimen (No. 165) obtained from the lesser sand plover, *Ochthodromus mongolus*, the type host of the parasite.

External anatomy.—Length only 35 millimeters, due no doubt to absence of gravid segments; maximum width 1.9 millimeters near posterior end. All segments wider than long. Head 0.5 millimeter across. Neck very short. Rostellum 0.23 by 0.11 millimeter in size, armed with about 100 hooks 25 microns long and arranged in a zigzag row possessing eight angles. Suckers 0.19 millimeter across, unarmed. Male genital openings irregularly alternate, in front of middle of proglottid margins.

Male genitalia.—Testes lacking. The absence of these organs in certain individuals of this species was observed by Clausen (1915), according to Tseng (1933), and by Tseng in the case of *Gyrocœlia fausti*. Cirrus pouch very large, bottle-shaped, 0.66 to 0.78 by 0.23 to 0.25 millimeter. Cirrus also well developed, armed with numerous, strong backward-pointing spines.

Female genitalia.—Ovary bilobed, 0.25 to 0.30 millimeter across. Vitelline gland 0.13 to 0.22 millimeter across, immediately behind ovary. Shell gland small, roundish, 0.03 millimeter across. Uterus appears early, first as a simple tubular ring, later with numerous outpocketings. Area surrounded by uterus filled with spongy tissue in some segments.

Host.—*Ochthodromus mongolus.*

Location.—Intestine.

Locality.—Palo, Leyte.

SUMMARY

In the study of a collection of cestodes of Philippine birds, nineteen different species have been identified, of which the following fifteen species are described as new: *Raillietina (Raillietina) daetensis*, *R. (R.) sequens*, *R. (R.) torquata* (Meggitt, 1924) var. *rajæ*, *R. (Paroniella) tinguiana*, *R. (P.) cirrofleza*, *R. (P.) coronea*, *R. (P.) culiauana*, *R. (P.) bulbularum*, *Cotugnia ilocana*, *C. rimandoi*, *Hymenolepis coronoidis*, *H. pycnonoti*, *Diorchis visayana*, *Haploparaxis sanjuanensis*, and *Kowalewskiella buzzardia*.

The following are reported for the first time from the Philippines: *Aporina delafondi* (Railliet, 1892), *Fuhrmanniella clerei* Tseng, 1933, and *Gyrocœlia paradoxa* (Linstow, 1906).

A species of *Hymenolepis* lacking rostellar hooks is described from a bulbul, *Iole gularis*.

REFERENCES

Baer, J. G. A propos d'une nouvelle classification des cestodes du genre Davainea R. Bl. s. l. Bull. Soc. Zool. France 60 (1931) 44–57.

Clausen, E. Recherches anatomiques et histologiques sur quelques cestodes d'oiseaux. Thèse, Neuchâtel. 1915. Cited by Tseng (1933).

Fuhrmann, O. Die Anoplocephaliden der Vögel. Centralbl. Bakt. Parasit. u. Infektionskh. 1 Abt. Orig. 32 (1902) 122–147.

Fuhrmann, O. Neue Davaineiden. Centralbl. Bakt. Parasit. u. Infektionskh. 1 Abt. Orig. 49 (1909) 94–124.

Johri, L. N. Report on a collection of cestodes from Lucknow (U. P., India). Rec. Indian Mus. 36 (1934) 153–177.

JONES, M. A new tapeworm from the guinea fowl, with cysticercoids in a ground beetle. In: Proc. Helminth. Soc. Washington. Journ. Parasit. 16 (1930) 158, 159.

JOYEUX, CH., and J. G. BAER. Cestodes d'Indochine. Rev. Suisse Zool. 42 (1935) 249–273.

JOYEUX, CH., and E. HOUDEMER. Recherches sur la faune helminthologique de l'Indochine (cestodes et trematodes). Ann. Parasit. hum. et comp. 5 (1927) 289–309.

LINSTOW, O. VON. Helminthen from the collection of the Colombo Museum. Spolia Zeylanica 3 (1906) 163–186.

MAYHEW, R. L. Studies on the avian species of the cestode family Hymenolepididae. Ill. Biol. *Monog.* 10 (1925) 1–125.

MAYHEW, R. L. The genus Diorchis, with descriptions of four new species from North America. Journ. Parasit. 15 (1929) 251–258.

MCGREGOR, R. C. A manual of Philippine Birds. Parts I and II. Bureau of Printing, Manila (1909) 769 pp.

MEGGITT, F. J. The tapeworms of the Rangoon pigeon. Parasit. 16 (1924) 309–312.

MEGGITT, F. J. On a collection of Burmese cestodes. Parasit. 18 (1926) 230–237.

MEGGITT, F. J. Report on a collection of Cestoda, mainly from Egypt. Part II. Cyclophyllidea: Family Hymenolepididae. Parasit. 19 (1927) 420–450.

MEGGITT, F. J. On cestodes collected in Burma. Part II. Parasit. 23 (1931) 250–263.

MOGHE, M. A. Two new cestodes from Indian Columbidae. Rec. Indian Mus. 27 (1925) 431–437.

RANSOM, B. H. The taenioid cestodes of North American birds. U. S. Nat. Mus. Bull. 69 (1909) 1–141.

ROSSITER, T. B. Hymenolepis farciminalis. Journ. Quekett. Micros. Club 10 (1908) 295–310.

SOUTHWELL, T. Cestoda. Vol. II. In: Fauna of British India, including Ceylon and Burma. Taylor and Francis, London (1930). IX + 262 pp.

TSENG, S. Studies on avian cestodes from China. Part II. Cestodes from charadriiform birds. Parasit. 24 (1933) 500–511.

YAMAGUTI, S. Studies on the helminth fauna of Japan. Part 6. Cestodes of birds. I. Jap. Journ. Zool. Trans. and Abstr. 6 (1935) 183–232.

ILLUSTRATIONS

Plate 1

Fig. 1. *Aporina delafondi* (Railliet, 1892) Baer, 1927, head.
2. *Aporina delafondi* (Railliet, 1892) Baer, 1927, mature segments.
3. *Aporina delafondi* (Railliet, 1892) Baer, 1927, gravid segment.
4. *Raillietina* (*Raillietina*) *dactensis* sp. nov., head.
5. *Raillietina* (*Raillietina*) *dactensis* sp. nov., *a*, rostellar hook; *b*, hook from sucker.
6. *Raillietina* (*Raillietina*) *dactensis* sp. nov., mature segments.

Plate 2

Fig. 1. *Raillietina* (*Raillietina*) *sequens* sp. nov., mature segments.
2. *Raillietina* (*Raillietina*) *torquata* (Meggitt, 1924) var. *vaja* var. nov., mature segments.
3. *Raillietina* (*Paroniella*) *tinguiana* sp. nov., head.
4. *Raillietina* (*Paroniella*) *tinguiana* sp. nov., mature segment.
5. *Raillietina* (*Paroniella*) *tinguiana* sp. nov., segment showing developing uterus.

Plate 3

Fig. 1. *Raillietina* (*Paroniella*) *cirroflexa* sp. nov., head.
2. *Raillietina* (*Paroniella*) *cirroflexa* sp. nov., mature segments.
3. *Raillietina* (*Paroniella*) *cirroflexa* sp. nov., segment showing developing uterus.
4. *Raillietina* (*Paroniella*) *bulbularum* sp. nov., head.
5. *Raillietina* (*Paroniella*) *bulbularum* sp. nov., mature segments.
6. *Raillietina* (*Paroniella*) *culianana* sp. nov., mature segments.
7. *Raillietina* (*Paroniella*) *coronica* sp. nov., mature segments.

Plate 4

Fig. 1. *Cotugnia ilocana* sp. nov., head.
2. *Cotugnia ilocana* sp. nov., mature segment.
3. *Cotugnia rimandoi* sp. nov., mature segment.
4. *Hymenolepis pycnonoti* sp. nov., head.
5. *Hymenolepis pycnonoti* sp. nov., rostellar hook.
6. *Hymenolepis pycnonoti* sp. nov., mature segments.
7. *Haploparaxis sanjuanensis* sp. nov., head.
8. *Haploparaxis sanjuanensis* sp. nov., rostellar hooks.
9. *Haploparaxis sanjuanensis* sp. nov., mature segments.

Plate 5

Fig. 1. *Hymenolepis coronoidis* sp. nov., head.
2. *Hymenolepis coronoidis* sp. nov., rostellar hooks.
3. *Hymenolepis coronoidis* sp. nov., mature segments.

FIG. 4. *Hymenolepis coronoidis* sp. nov., egg.
5. *Hymenolepis farciminosa* (Goeze, 1782), rostellar hooks. (From Meggitt, 1926.)
6. *Fuhrmanniella clerci* Tseng, 1933, head.
7. *Fuhrmanniella clerci* Tseng, 1933, rostellar hook.
8. *Fuhrmanniella clerci* Tseng, 1933, mature segments.

PLATE 6

FIG. 1. *Hymenolepis* sp., head.
2. *Hymenolepis* sp., mature segments.
3. *Kowalewskiella buzzardia* sp. nov., head.
4. *Kowalewskiella buzzardia* sp. nov., rostellar hook.
5. *Kowalewskiella buzzardia* sp. nov., mature segment.
6. *Kowalewskiella buzzardia* sp. nov., gravid segment.

PLATE 7

FIG. 1. *Diorchis visayana* sp. nov., head.
2. *Diorchis visayana* sp. nov., rostellar hook.
3. *Diorchis visayana* sp. nov., mature segments.
4. *Gyrocotyle paradoxa* (Linstow, 1906), rostellum.
5. *Gyrocotyle paradoxa* (Linstow, 1906), rostellar hook.
6. *Gyrocotyle paradoxa* (Linstow, 1906), mature segment showing female genitalia and cirrus pouch.
7. *Gyrocotyle paradoxa* (Linstow, 1906), segment showing developing uterus.

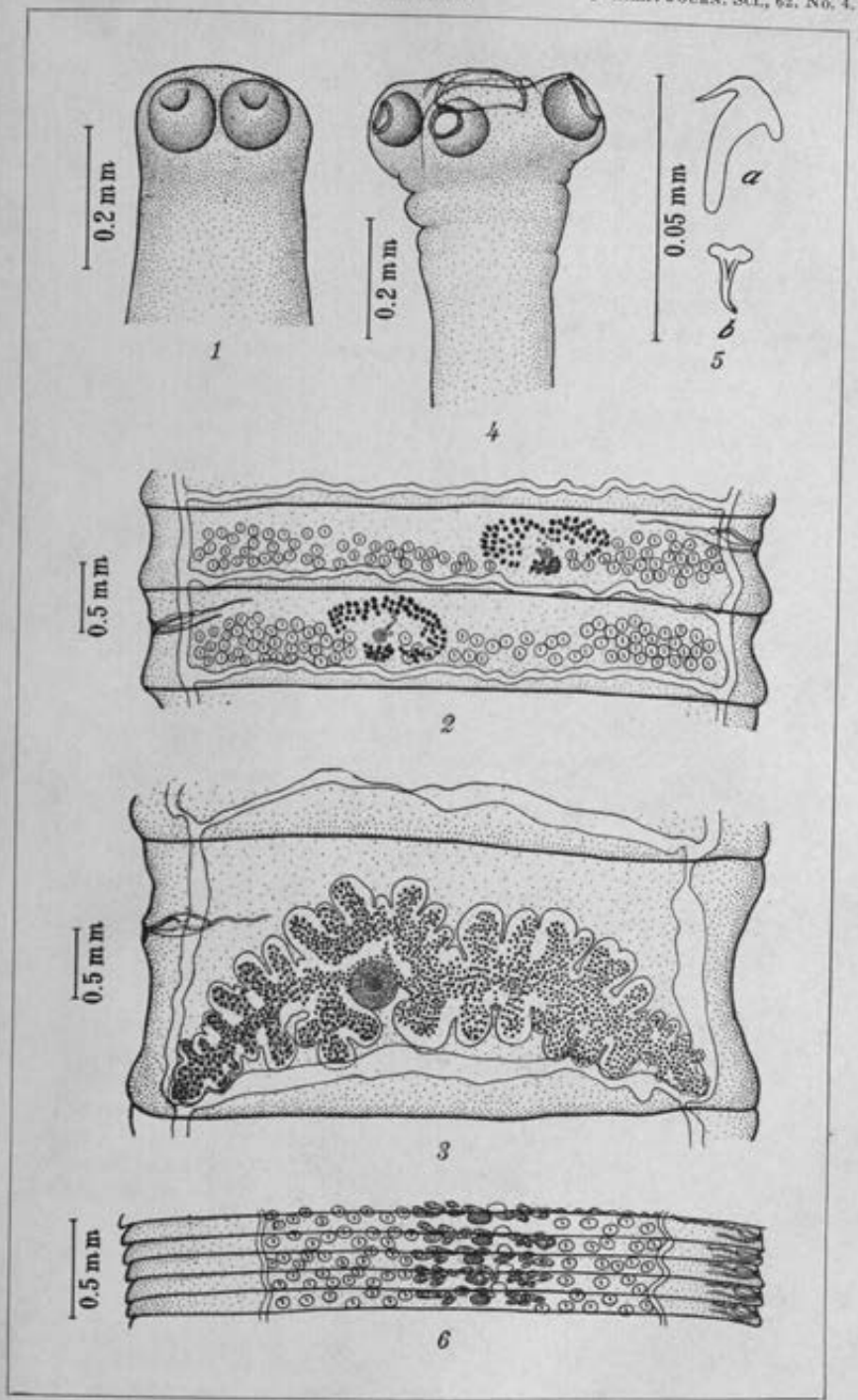


PLATE 1.

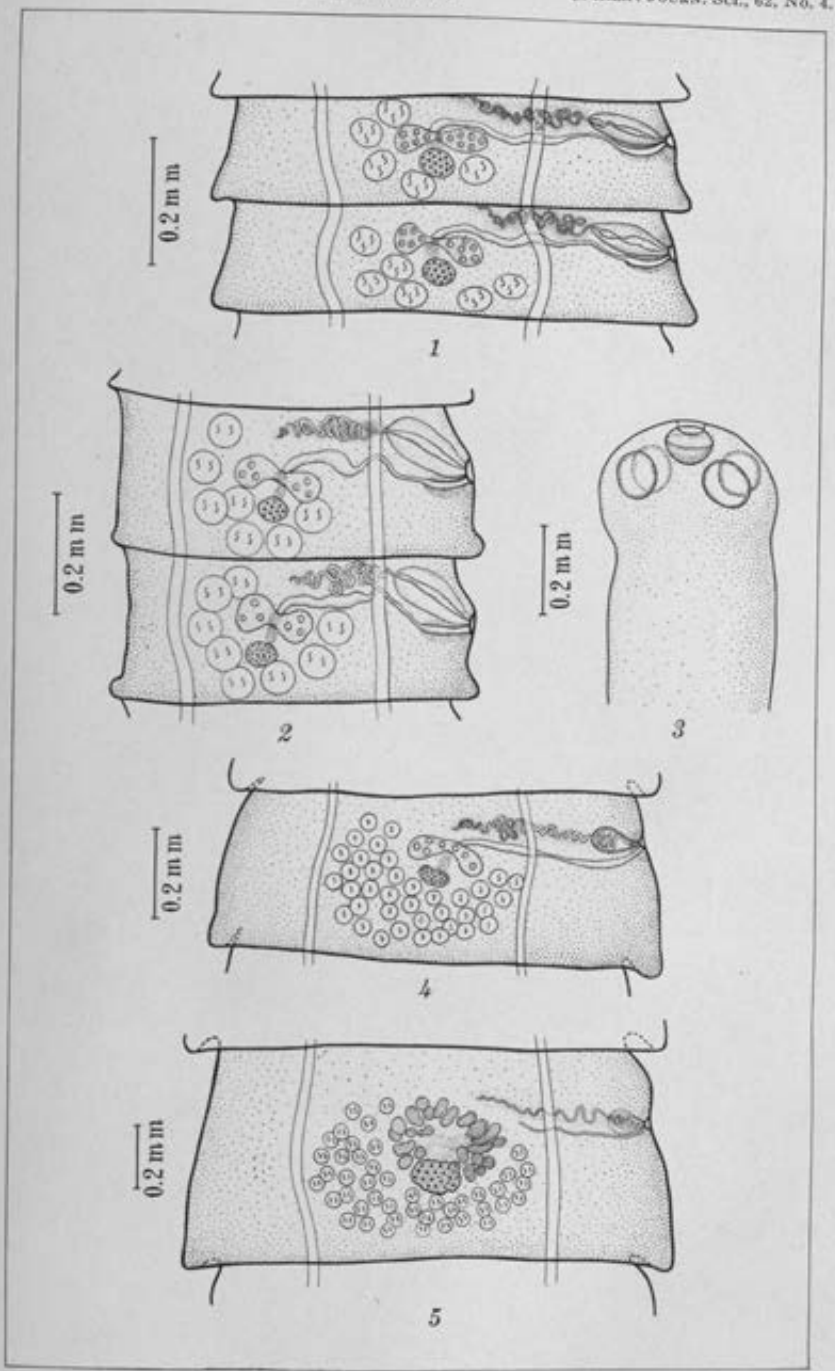


PLATE 2.

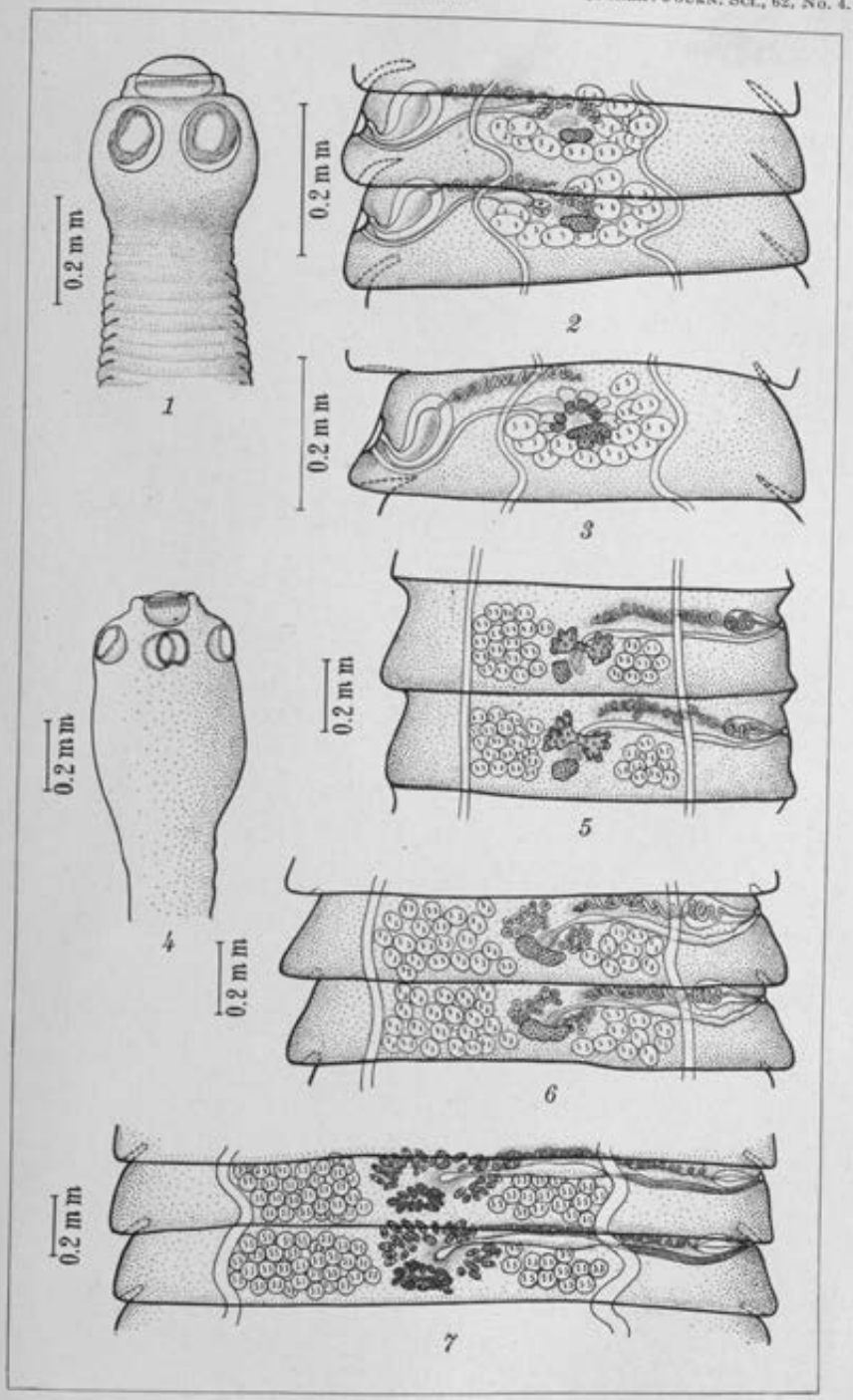


PLATE 3.

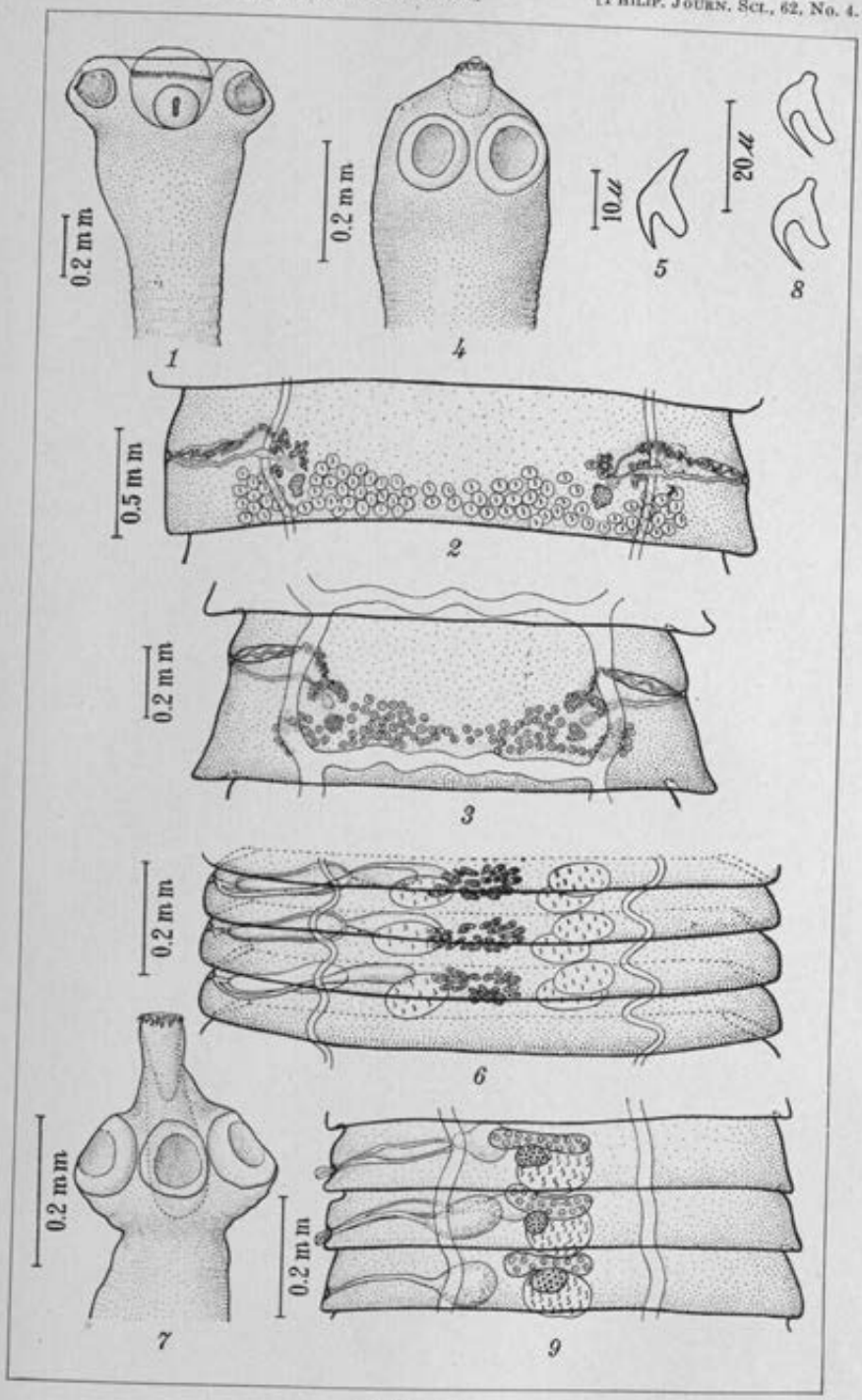


PLATE 4.

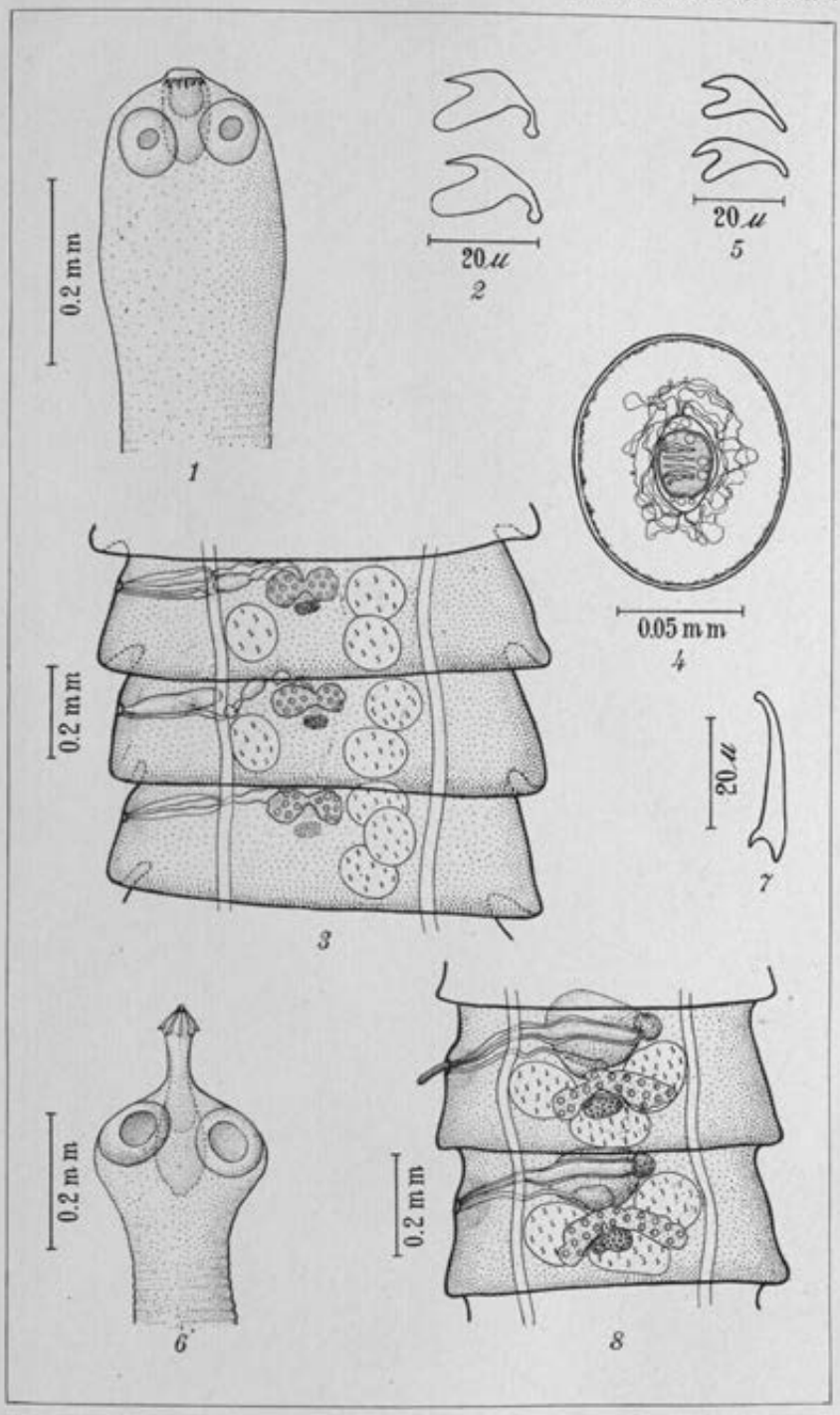


PLATE 5.

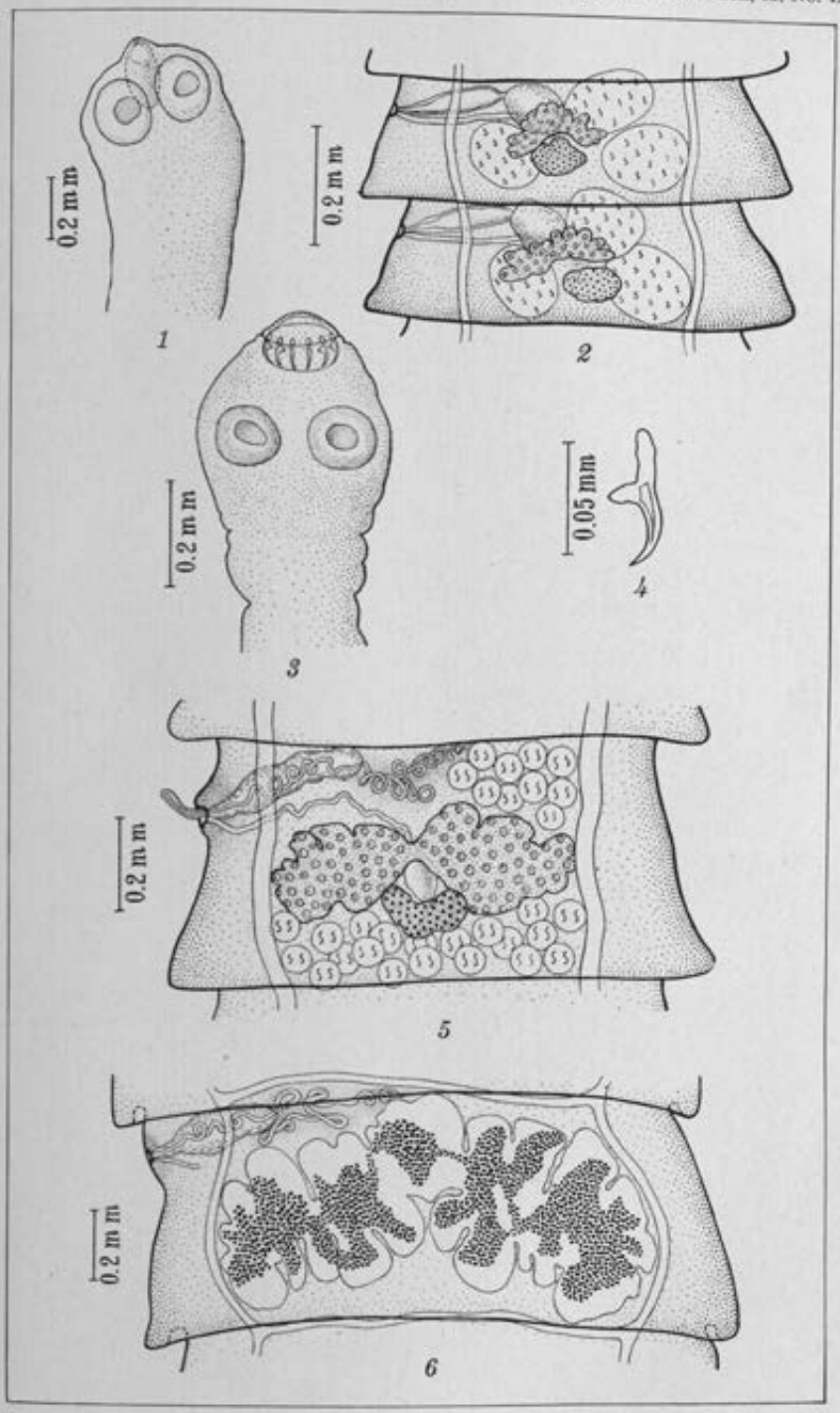


PLATE 6.

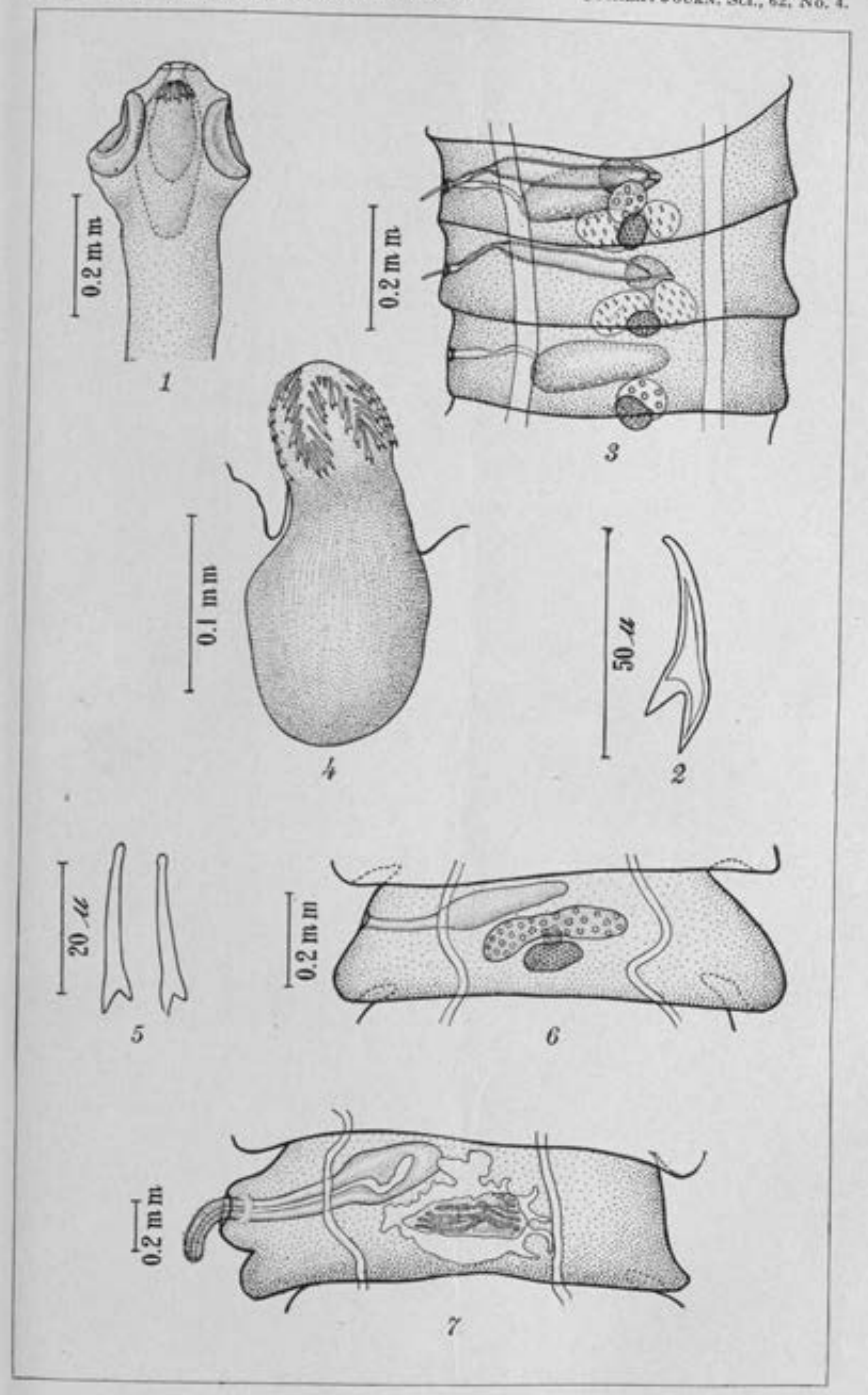


PLATE 7.

VARIATIONS IN THE ACTINOMYCETES, IN CONNECTION WITH THE THEORY OF THE MYCOTIC NATURE OF THE VIRUSES OF TUBERCULOSIS AND LEPROSY.[1]

By W. I. Kedrowsky

Professor of the Second Moscow Medical Institute
Chief of the Leprosy Department of the Tropical Institute, Moscow

TWO PLATES

I

Many years ago, when studying the causative organism of leprosy, I advanced two essential conceptions: (*a*) Acid-fastness is an unstable condition which can vary within wide limits up to complete disappearance; thus, the leprosy bacillus (and by analogy also that of tuberculosis) can exist in both acid-fast and acid-sensitive forms. (*b*) The causative germ of leprosy can change in an artificial medium (or, of the same effect, when in the outside world) into a more highly differentiated microbe, a mycotic form of the type of *Actinomyces* or *Streptothrix*.

With regard to the possibility that the Hansen bacillus can exist in a non-acid-fast form, I succeeded in transforming by animal passage non-acid-fast diphtheroids isolated from leprous material into acid-fast rods that were morphologically similar to the leprosy bacillus. At the time I had no direct proof of the mycotic nature of the leprosy organism. My conclusions were based on the fact that by culturing material from organs of rabbits that had died of infection with cultures obtained from leprous material,[2] I often obtained, besides colonies of acid-fast bacilli, actinomycetic growths in the substratum. Isolated colonies of the mycotic growth contained acid-fast rods, sometimes in considerable quantities, that persisted and multiplied, living there as symbionts in a number of generations. Consequently, I could not but suspect a genetic relation between these

[1] Read (abbreviated) at the Scientific Conference of the Tropical Institute and the Tuberculosis Section of the Association of Microbiologists, November–December, 1933.

[2] These cultures I considered then, and still do, to be genuine cultures of the leprosy "bacillus."

rods and the mycotic organism itself, especially since I was (and still am) confident of the faultlessness of my technic. Naturally, I realized that such observations, however convincing to me, might not convince others. There could be raised the objection that I was dealing with a contamination, and more convincing evidence was required.

Not until 1922, twelve years after the publication of the last of my main articles on the subject, did I have the opportunity to start work to obtain the necessary data. Since then I have collected an abundance of laboratory material, but the detailed study of it could not be taken up until recently. In the meantime these problems have begun, more and more, to attract the attention of other investigators. Therefore, I have decided to record the main facts of the observations which I have made over many years, presenting them in the form of summarized generalized conclusions. This communication is a third attempt to formulate my concepts in a generalized and somewhat schematic manner.[2] It is a study of the relationships between the various representatives of the large group of mycotic organisms that are known under the indefinite names of *Actinomyces, Streptothrix, Oöspora, Nocardia* (French authors), and also *Cladothrix*, which is quite incorrect and now seldom used.

While most infectious diseases have received more or less clear elucidation through clinical and microbiological studies during the last decade, our knowledge of the actinomycetic diseases and their causative germs remains about as it was thirty or forty years ago. Since the time of Petruschky we usually distinguish two forms of these diseases: (*a*) The actinomycoses, caused by organisms that give retort-shaped swellings and form compact radiating clumps (zoöglœa) that have been called druses; and (*b*) the streptothricoses, caused by mycotic organisms that do not give such swellings and druses, but form soft, sometimes starlike, interlacing, short filaments. Beresinev distinguishes the first of these as "typical actinomycosis," proposing the name "atypical actinomycosis" for those forms that are caused by a special variety of the mycotic organisms, morphologically very near to "streptothrix" but differing from it, like the tubercle bacillus, by being acid-fast. Finally, Savchenko has described a case of actinomycosislike disease caused by a rod-shaped microbe that produces druselike growths analogous to those of the filaments of actinomycetes.

[2] For the first two attempts see references 12 and 13.

If to the foregoing are added the well-known facts that the cultures of actinomycetes isolated by different authors can produce various pigments, that some actinomycetes can grow only aërobically and others only anaërobically, that pathogenic significance has been ascribed only to the latter, that the possibility of infection of animals with the mycelium is still doubtful, and finally that the actinomycetes are abundantly disseminated in the outside world, then we have practically exhausted the knowledge that we had until recently about the mysterious group of "filamentous-mycotic" organisms the study of which, in my opinion, will bring much new and unexpected knowledge to the science of microbiology. Only during recent years has the interest of microbiologists been attracted to this neglected field. The works pertaining to the subject are so few and disjointed that I shall not dwell on them, especially since, though written long after most of my own investigations had been completed, they add nothing new or unexpected.

II

In my investigations I used the actinomycetes or streptothrices (I consider these denominations identical) which I isolated from so-called pure cultures of tuberculosis and leprosy bacilli. I have isolated fifteen cultures of such actinomycetes—eleven from human tuberculosis, one from avian tuberculosis, and three from my strain of leprosy. The methods of obtaining these cultures will be published later; here I speak only of the cultures themselves.

At the very beginning of the work I was much surprised by an extremely important fact, one that was very puzzling and that caused me to question the correctness of my hypothesis and the exactness of my technic. This fact is that the cultures of actinomycetes that I isolated at different times from a given culture (for example, tuberculosis) gave such variegated pictures of growth that I could not classify them as of one definite type. Only many years later, after studying very many cultures, was I able to unriddle this phenomenon and to develop it on a systematic basis. The matter stands as follows:

If a typical culture of actinomycetes (as described in any textbook) is subcultured at short intervals (that is, one, two, or three months) in the same medium in which it has been grown, we obtain the growth that is typical for the culture: it forms a thick, very compact pellicle that is cut with difficulty,

adheres tenaciously to the substratum, and at a definite time becomes covered with a chalklike spore-bearing film. If, on the other hand, this same organism is subcultured on a medium poorer in nutrients (especially if there is an abundance of water of condensation), and, what is of the utmost importance, if the subcultures are made at longer intervals (nine, twelve, eighteen months), new changes take place in the picture of growth. Sometimes gradually, through a number of generations, sometimes suddenly, as if by mutation, the pellicle becomes soft and moist, forms folds that are sometimes oddly ornamental, is easily removed from the substratum and split by a spatula, though when slides are prepared the growth is emulsified with some difficulty.

If such a transformed variant is subcultured at this stage of its development on the same or a similar medium, it gives, on the whole, about the same picture of growth, with perhaps some small variations of detail. If, however, it is left alone, a very curious picture develops, which as far as I know has not been noted by anyone. The growth becomes of soft consistency, very moist, changing into a glasslike mucoid mass that covers the surface of the medium with a thin layer. When an attempt is made to scrape off part of it, it stretches into short filaments, easily emulsified on a slide. This mucuslike transformation of my cultures caused me a great deal of trouble, since it often ended by destruction of the actinomycetes if subcultures were not made in good time.

I have presented here only a general orientational scheme of the process noted. It is obvious that at different stages of its rather long development there are possible deviations as regards the peculiarities of growth of the cultures, but I feel warranted in speaking of a systematic nature of the phenomenon as a whole, as it has been observed in a large number of cultures.

Turning now to the morphological behavior of the actinomycetes in a gradually changing culture, we see the following picture: In the original culture the organism reveals, as usual, long, frequently branching filaments, with feltlike, thickly interwoven threads. In cultures that begin to soften, the threads show a tendency to undergo septation and to break up into separate segments. These segments are sometimes long, but sometimes they are so short that they cannot be distinguished from bacillar forms. In cultures that soften further, the septation becomes more pronounced and the number of short threads and bacillary forms increases, whereas the threads,

twisting spirochætelike, form loose starlike figures that remind one of similar starlike variants observed in cases of actinomycosis that grows without druse formation. Cultures that have become mucoid and dissolved consist for the most part of granular protein detritus with small amounts (varying according to the age and condition of the growth) of separate clumps—remnants of loose, interlaced filaments of the actinomycetes. Among the amorphous protein granules can sometimes be found considerable numbers of clearly defined, prominent but minute, dotlike granules, very like Paschen bodies as they appear in the cow-pox detritus after special staining. If observation is continued, after a short time the threads and filaments disappear altogether, and the whole content of the mucoid material that covers the surface of the medium consists of protein detritus, among the shapeless clumps of which are clearly distinguishable the regular minute à la Paschen granules.

During the process of these observations, which have been made many times, three features have attracted my attention:

(1) When the spores (oidia) taken from the chalklike, downy film are stained by the Ziehl-Neelsen method, some retain the red and some are blue. This is not true of all cultures that have aërial mycelia, but it has been observed quite frequently.

(2) At a definite period of their development the filaments of the actinomycetes become granular. The size of the granules is variable, starting from those with a diameter only slightly exceeding that of the threads, and ending with bodies that can be seen with the naked eye. This granule formation is seen in the separate parts of the threads, no matter how short they may be. Besides these granules encompassed within the threads, the cultures often reveal larger, free-lying, spherical bodies the diameter of which exceeds that of the threads by two or three times, and which stain intensely blue when double staining is used. I have not sufficient evidence to permit me to judge of the significance of these spherical formations or their relation to the filaments and the granules that are included in them.

(3) The threads of mycelium, as has been noted, may fragment into rod-shaped segments. To this phenomenon I have always ascribed the greatest significance. In it lies the key to further understanding of the genetic relationship between the actinomycetes and the diphtheroids. Consequently, I have concentrated mainly upon the study of these relations between the different representatives of the general group of microbes, at one end of which stand such complex forms as the actino-

mycetes and at the other (I have sufficient evidence to support this) such apparently simple microbes as the sarcinæ. The diphtheroid group occupies a middle position between the two.

III

The phenomenon of septation or fragmentation of the actinomycetic filaments into bacillary forms was noted long ago. Sometimes this change has occurred to such an extent that the number of rod-shaped forms in the culture greatly exceeded the amount of the thread forms. See, for example, Lieske,(16) figs. 18, 23, 25, 29, and 37. However, as far as I know none of the authors who noted this phenomenon suspected that rods can be obtained in pure culture, and that thus a bridge is thrown across the gap between the microbes of complex organization and those more simply organized. Even Lieske, who worked with the actinomycetes more than anyone else, went no further than the conclusion that the bacillary forms are "cylindrical spores" of the mycotic organisms. Marie Triuss and Elena Politova(21) came nearer to the nature of this phenomenon; they dissociated into segments, both in vivo and in vitro, the mycotic organisms obtained from ordinary cases of actinomycosis. Unfortunately, their valuable investigations are incomplete, mainly in the lack of cultures of the rods obtained through dissociation, and also in the lack of histologic pictures from experimental animals. However, they gave a correct analysis of the genetic relation that exists between the mycotic organisms and the rods dissociated from them, both acid-susceptible and acid-fast.

The same idea of this relation is presented in the works of Karwacki,(9) who observed fragmentation in the cultures of streptothrices, which he often isolated from tuberculosis material. More guardedly, but with sufficient confidence, the same question is discussed by Jensen,(8) who isolated from Australian soil two strains of a microbe that "exhibited characters belonging to both the genera *Actinomyces* and *Mycobacterium*, which are not very well separated from each other. In quite young cultures it formed branching filaments, which soon broke up into short, rod-shaped, partly acid-fast elements, so that in this stage the organism could not be distinguished from the ordinary saprophytic mycobacteria." However, the old cultures (four to five weeks) produced "spots of white aërial mycelium," and by plating from this mycelium cultures were obtained which

consisted of "richly branching mycelium, entirely actinomyces-like, without any tendency to spontaneous fragmentation."

In my communication published in 1910,(11) plate 11 presents six figures illustrating the fragmentation of the filaments of microörganisms isolated from experimental animals into separate rods, lying either free or collected into small groups. These pictures, which I saw many times in material from the lower part of the cultures that was usually washed off by the water of condensation and comparatively quickly softened, first led me to think that here might be found proof of a genetic relation between the actinomycetes and the diphtheroids.

A further stimulus in this direction was received in 1923 when, with the aid of G. E. Platonov and the use of his method, I isolated for the first time from a culture of human-type tuberculosis a culture of actinomycetes. From the first this culture was of soft consistency, and on solid media exhibited a moist growth of brownish color, with folds that sometimes became covered with a white, chalklike, spore-bearing layer. The film could easily be removed from the medium or split with a spatula, and was comparatively easily emulsified. Under the microscope the culture consisted of loosely interlaced threads that bore on their ends rows of rod-shaped segments, of which abundant quantities were seen throughout the culture.

In broth-tube cultures the growth exhibited a peculiar feature, which I had seen before in studying actinomycetes isolated from ordinary cases of actinomycosis. The growth appeared at the bottom of the tube, forming a number of spherical colonies 3 to 5 mm in diameter (zoöglœa, consisting of interlaced filaments of mycotic organisms), which in a few days rose as a beaded, broken chain along the side of the tube, reaching the surface of the broth. At the surface at the place where the liquid touches the glass it formed a film that rose 2 to 3 mm along the glass and gradually spread over the entire surface of the medium. The globular colonies were of quite regular form, but of variable consistency; they were sometimes compact and opaque, sometimes soft and so transparent that in transmitted light their feltlike structure was easily distinguishable. These masses were undoubtedly fastened to the glass, but so loosely that at the slightest jar they were shaken loose and fell to the bottom at a speed dependent upon their relative specific gravity. At the same time the pellicle that developed on the surface became more compact, and so adherent to the glass that some effort was re-

quired to shake it off, after which it fell to the bottom. Within a short time a new pellicle usually appeared, but in most cases this was much thinner and softer than the first.

The same features were seen, but more conspicuously, when the organism was cultivated in a small flask (150 to 200 cc) half filled with the broth. The globular masses appeared in larger numbers and they were much larger in size, but otherwise the whole process seen in the tubes occurred here. The compact masses were brownish; the soft, transparent ones were almost flocculent; and intermediate forms were seen. Not until much later did I fully appreciate the significance of this observation. It gave evidence of the segmentation of the actinomycetes into a number of separate variants, for it was found that these different globes, removed (by one way or another) and transferred to solid media, gave rise to new cultures that differed from one another in many ways—being sometimes compact and smooth, and sometimes wrinkled and soft, with variations to one side or the other.

If the flask was periodically shaken, the softest of the globes were changed into flakes that became smaller and smaller, and the broth became turbid. Microscopically the flakes and soft globes consisted of comparatively short threads, either lying free or softly interlaced, but often separated into short rodlike segments, which are partly lying free. By the method of "fractional culture," which I employed long before it came into common use under the name of "dissociation," these rod-shaped elements could be isolated, though not without some difficulty.

Even more convincingly the same results were obtained in the study of the isolated mycotic organisms. It was found that a culture, if subcultured regularly (every two or three weeks) on solid media (agar and potato), invariably gave the same type of growth. However, the original growth that remained for three months without being subcultured underwent a change, the film becoming moist and softer. When the growth was transferred into broth, so that part of the material remained floating on the surface, an interesting picture was noted, which I will give here in the way it was noted in the protocol. The observation was made in 1923.

OBSERVATION 1

March 3. Culture in flask, dextrose broth. Thermostat.

March 6. Slight growth; separate, small (pinhead size), compact, brownish colonies that have developed peripherially on the

surface of the medium and are adherent to the glass. The plated film is slightly increased circumferentially, forming a thin, delicate ring around the edge.

March 16. The number of colony dots increased. The ring around the plated pellicle wider.

March 19. On the glass at the surface of the medium is a complete ring of confluent small colonies. A thin, semitransparent film covers almost the entire surface. On it are islets of a thin, white, spore-bearing, downy coating.

March 23. The ring on the glass is wider and more compact. A chalklike down in the form of multiple colonies covers the greater part of the film.

March 27. The film, fusing with the peripherial ring, covers the entire surface. It is covered by a thick layer of chalklike coating. Broth still clear.

March 29. The film has separated from the glass and is partly immersed. Wetted by the broth, the chalklike down has become moist. The broth is turbid.

April 7. The film is fully immersed, the broth turbid.

April 11. On the surface is a new film, thinner and more transparent than the first, as if the medium were covered by a thin layer of paraffin.

April 20. No change. No down on the surface of the film.

Microscopically almost the same forms were found in both the film and the broth: threads that break up into coccoid and rod-shaped forms, and free-lying "coccoids" and rods. By fractional culture on dextrose, glycerin, and plain agar in tubes (not on plates) the rods were isolated without difficulty into separate cultures. They exhibited all the characteristics belonging to the diphtheroid group.

This experiment was repeated four times, always with the same results. Before the work was started the original culture was repeatedly "purified" by plate subcultures. I had no opportunity at that time to apply the Burri method or to employ the micromanipulator.[1]

Thus, twenty years ago I had proof that the complex mycotic organisms of the *Actinomyces* type can be broken up (or, using

[1] It was demonstrated later that the phenomenon of softening of the film appeared earlier or later in any subculture from the original culture in a number of strains of the actinomycetes. These observations, made in 1923 and 1924, served as the starting point for further investigations in the same line that permitted me to establish the systematic nature of the observed phenomenon which I have described.

the modern terminology, dissociated) into simpler elements. I did not wish, however, to publish my observation then, as it was made at a time when the "monomorphistic" views prevailed, and a report published at that time would be lost among other "incidental" papers. Moreover, it referred only to one strain of actinomycetes, the origin of which might be considered doubtful from the beginning. It was only much later, when working with other actinomycetes isolated from acid-fast cultures, that I became fully convinced of the systematic nature of the phenomenon.

At the same time, studying in detail these less complexly organized elements, which were obtained by dissociation, I became convinced that, from their morphologic and cultural characteristics, they can be included in the group of microbes that Babes first proposed to designate as "diphtherideen," and which I later referred to as "diphtheroids." I do not wish to give here an exact definition of this group of microbes—it becomes more or less clear without it—but only to point out that among various representatives of this group there are wide variations in morphologic features and, it may be supposed, a priori, in biologic characteristics. To this class of organisms must be added the large group of acid-fast bacilli (including those of tuberculosis and leprosy), in view of the possibility of their existence in a non-acid-fast form.

IV

The phenomena described above, in spite of the fact that they promised large perspectives for further investigation, did not satisfy me for the reason that the main ultimate purpose of my investigations was to produce irrefutable proofs in favor of my old view with regard to the mycotic nature of the tuberculosis and leprosy bacilli. These proofs, in my opinion, could be obtained by investigations in two directions: (*a*) Inoculation of actinomycetes to cause a tuberculosislike disease and (*b*) attempts to transform a non-acid-fast diphtheroid isolated from the cultures of actinomycetes into an acid-fast form in vivo or in vitro. The first task I completed in 1926; the second was successfully solved under my guidance by N. V. Galanova, in 1933 and 1934. My personal experience was as follows:

OBSERVATION 2

April 18. A cranial trepanation was made in a rabbit weighing 2,000 grams.

April 19. Through the trephine opening a rich emulsion of a two-weeks' culture of actinomycetes was injected. The culture had been obtained one and one-half years previously from an old culture of human tuberculosis by W. A. Krestovnikova, of the Mechnikov Institute. The culture ("*Actinomyces K.*") was grown in the thermostat, then kept at room temperature, and subcultured from time to time at intervals of one to two months.

August 3. The rabbit showed paresis of the hind legs. After a few days this passed into full paralysis. In view of the development of an ulcer the rabbit was killed (air embolus). At autopsy, besides a small ulcer on the scrotum, there were also noted: A few small milletlike tubercles disseminated under the pleura of the right lung and part of the left lung; a considerable number of similar but smaller tubercles (from pin-head size to just visible to the naked eye) in the subserosa of the cæcum and the blind end of the sacculus rotundus; a larger number of tubercles disseminated in the subserosa of the rectum.[3] The upper part of the right epididymis had an oval nodule, 0.7 by 0.4 cm, with caseous necrosis. One of the right inguinal lymph nodes was enlarged (0.5 by 0.3 cm); three others (one on the right and two on the left) had increased very little if at all.

Under the microscope all the tuberclelike formations in the intestines consisted of clumps of epithelioid cells that formed larger or smaller islets, the larger of which had undergone caseous degeneration centrally (Plate 1, figs. 1 and 2). The islets were situated in the adenoid tissue, with which the mucous membrane of the colon and appendix (sacculus rotundus) of the rabbit is so rich. On studying the smallest of these islets a definite impression was gained that they originated from reticulocytes of this adenoid tissue. The islets were mostly round or oval, very regularly defined, and only in the rectum (where the adenoid tissue is scant or absent) they became irregular or triangular, spreading on both sides along the large lymphatic vessels that pass between the different layers of the intestinal wall. The caseous nodule of the epididymis proved to consist entirely of epithelioid tissue the greater part of which, starting from the center, had undergone necrosis. In the lymph nodes the same clumps of epithelioid cells were noted, forming either small, almost rudimentary, round or oval islets that

[3] Most of these nodules were hidden by the smooth surface of the intestines; only a few of them, the largest, raised slightly the serous surface.

developed in the follicles, or larger islets of irregular form that developed in the sinuses. In the large gland was also found hyperplasia of the entire lymphoid tissue that distorted the structure of the gland and caused marked dilatation of the blood vessels of the hiluses. Small round or oval islets of epithelioid cells were found also in the liver and spleen, with an admixture of "round" cells in the former organ. Comparatively large nodules of the same structure with a definite tendency towards necrosis were found in the lungs under the pleura, and sometimes on the pleura itself. On using the Ziehl-Neelsen stain acid-fast bacilli were found in the affected areas, and it is interesting to note that the older the process the greater was the number of bacilli. In the spinal cord changes were found in the soft meninges, the medullary tissue, and the roots of the nerve fibers that go from the cord. These were small nodules of regular form, consisting of epithelioid cells, together with quite large lesions ending in caseous necrosis (Plate 2, figs. 3 and 4). The Ziehl-Neelsen stain revealed in these lesions also the presence of acid-fast bacilli of the type of tubercule bacilli.

The significance of these findings is clear. The actinomycetes obtained from a tuberculosis culture, injected into the brain of the rabbit, "dissociated" into bacillary elements that in the living medium again acquired their old biochemical characters and caused a number of lesions that were completely similar to the changes that are caused by tuberculosis.[6]

The changes noted in this case, especially in the spinal cord and the intestinal wall, are much like those obtained by inoculating into a rabbit a non-acid-fast diphtheroid that I had isolated from leprous nodules.[7] In both cases the lesions were chiefly in the lumbar part of the spinal cord and the lymphoid tissue of certain parts of the intestines; they contained areas of epithelioid tissue with a more or less definite tendency to caseous necrosis, and they revealed very similar acid-fast bacilli. However, there was an essential difference with regard to the numbers of bacilli and especially their relations to the epithelioid cells. In the case of leprosy the bacilli were very numerous and mostly situated inside the epithelioid cells around the rarefied areas of the cytoplasm; in the tuberculosis material the bacilli were comparatively very few and they were found mostly free of the

[6] Unfortunately, because of technical conditions, I could not obtain from the experimental animal a strain of the bacilli; no attempt was made to culture them further on laboratory media.

[7] See my 1910 communication[11] photographs 1 to 4, 34, 35 and fig. 55.

cells, and when occasionally they were inside the epithelioid cells the number was small—two, five, or seven in a cell. There were also other essential differences. In the leprosy material the changes were found mostly in the soft meninges, from which the process started; in the tuberculosis material the principal lesions were in the medullary tissue itself; though here, also, the process evidently started from the soft meninges. In leprosy the tendency to necrotic change was slight; in tuberculosis this tendency was more apparent.

The observations of Galanova were as follows: By fractional subculturing on plates she isolated a non-acid-fast diphtheroid from a culture of actinomycetes, and by growing it in milk she transformed it into an acid-fast stage. These organisms inoculated into animals caused the appearance of disseminated tubercles. Similar experiments have been carried out with a diphtheroid isolated from a culture of the human tuberculosis bacillus.

OBSERVATION 3

In 1932 I isolated from a "classical" culture of tuberculosis, obtained the year before from the sputum of a patient, a culture of actinomycetes (N 290) that gave on potato a crumbly, granular growth that appeared as a yellowish sponge, slightly raised on the surface of the medium. The growth was easily split, emulsified comparatively easily, and from the first was rich in segmented threads that at the ends broke up into a number of short, rod-shaped segments. Shortly afterwards the growth became moist (beginning of lysis) and the number of rod-shaped elements increased. On plating from these, Galanova isolated a number of colonies of granular, non-acid-fast rods of diphtheroid type. The corresponding cultures were designated N 290 D_1, D_2, and D_3.

Beginning April 6, 1933, these three cultures were subcultured in milk and every five to seven days were examined microscopically and new cultures made. On the seventh passage, in D_1, acid-fast rods were noted for the first time. The numbers of these increased in further cultures (nine or ten) to such an extent that subcultures of them on glycerin agar and on serum-nutrose-glycerin agar (Wassermann) gave growths that consisted mostly of that form. These cultures at first grew quite rapidly (eight to ten days), looked slightly moist (that is, had a homogeneous appearance), and contained a smaller or greater admixture of non-acid-fast forms. At present, however, they grow much more slowly, are much drier, and on the whole do not differ from the

ordinary ("typical") cultures of human tuberculosis. The diphtheroids D_1 that were not passed through milk remained in their former non-acid-fast state. In D_2 the numbers of acid-fast forms varied greatly but at most were comparatively limited, and when transferred to solid media only strains of non-acid-fast rods were obtained. Unfortunately, due to technical conditions, investigations with this strain had to be interrupted prematurely. In D_3, if acid-fast organisms appeared at all in some passages, their numbers were very small. All three diphtheroids, not passed through milk and subcultured only on solid media (the Wassermann agar included), have remained non-acid-fast to the present time.

December 1, 1933, the acid-fast strain D_3 isolated from milk was inoculated into a guinea pig (weight 310 g). The growth on agar was washed off with saline and the emulsion diluted to a titer of 2 milliards. One cc was injected into the peritoneal cavity.

March 23, 1934, the animal died. There was frank tuberculosis with large caseous nodules in the liver, spleen, omentum, and lymph nodes. Cultures on Hohn medium, Wassermann medium, and glycerin potato gave ordinary growths of tubercle bacilli.

OBSERVATION 4

In 1925 I received from S. I. Guinzburg, of the Mechnikov Institute (Moscow), a typical culture of tuberculosis. At present, after many years of cultivation, not always done regularly, it exhibits a moist, mucoid appearance ("homogeneous" of Arloing-Courmont). Microscopically it has sometimes shown an admixture, at times quite notable, of non-acid-fast bacilli. Galanova isolated from this culture four colonies of non-acid-fast diphtheroids, designated as GD_1, GD_2, GD_3, and GD_4.

March 23, 1933. These growths were transferred to milk. On the ninth day the diphtheroids in all tubes showed no change, but on the sixteenth day tube D_1 contained about 50 per cent acid-fasts. However, a fractional subculture on plates (April 10) gave only eight colonies of diphtheroids and none of acid-fast organisms.

April 16. The eight colonies referred to were again subcultured in milk. After seven days all tubes contained an admixture of acid-fasts. Transfers to glycerin agar gave only diphtheroids except in one tube, which on the fourteenth day showed a wrinkled, dry film that crumbled on emulsification.

Under the microscope this consisted of red granular rods identical with tubercle bacilli. The new culture is designated as the original one, D_1.

In strain D_2 acid-fast forms began to appear only after the sixteenth passage, and these gradually increased until after the twenty-fourth passage a subculture on Wassermann agar gave a growth of acid-fast microbes with only a small admixture of non-acid-fast bacilli.

Two guinea pigs (weight 265 and 230 g) were inoculated January 1, 1934, with cultures D_1 and D_2. Because of lack of animals the material inoculated was a mixture of the two cultures. The dosage and route were as in observation 3. One guinea pig died January 30, and the other, March 23. Both animals showed the ordinary picture of general tuberculosis, more marked in the second one. From the liver of this second animal, and from an enlarged caseous lymph node of the first, tubercle bacilli were isolated.

These last observations give me the right to draw a definite conclusion. Granting that my experiment with the rabbit was not conclusive, since the filamentous mass of the actinomycetes might also have contained tubercle bacilli from the culture from which the actinomycetes was grown, the last two observations completely avoid that possible complication.

V

Summing up my numerous observations, I conclude with a certain degree of satisfaction that the principal object of my work—to establish the mycotic nature of the causative organism of tuberculosis and leprosy—is in the main completed. But in the course of this work there have arisen, quite incidentally but none the less insistently, two important questions that I believe will become the subject of detailed study in the near future: (*a*) One of these questions concerns the reversibility of some of the phenomena that I have observed; (*b*) the other is with regard to pigment formation.

The first question may be itself divided into two parts: (*a*) The reversibility of diphtheroids into actinomycetes, and (*b*) reversion within the group of actinomycetes itself from the more "degraded" forms to the more vigorous ones which, in agreement with Berestnev, I designate as "typical." With regard to the first part of this question, having no personal observations I can only refer to the literature on the subject, pointing out the

work of Cache,(6) Spirig,(20) and Brullova,(5) who proved the possibility of transforming the diphtheria and pseudodiphtheria bacilli into actinomycetes. For my own part, I can add that the possibility of reverting acid-fast "bacteria" into actinomycete-like forms serves as a positive answer to the above question. As for the second part of the question, the matter is much simpler if the nature of the process is not considered. I have succeeded in reverting my weak (atypical) cultures of the actinomycetes into vigorous (typical) cultures by employing various methods:

1. By selection of the cultures. This method can be employed with both solid and fluid media. In the numerous subcultures that I have had at my disposal (made for the purpose of preserving the strains and their substrains) I often observed that the same culture, even when growing on the same medium but more noticeably when on different media (agar, serum-nutrose-agar, simple and glycerin potato), gave growths that sometimes appeared more or less compact and sometimes soft and mucoid. Obviously, to preserve the culture the first modification was used. Fluid media could also be used with success, at least in some instances. As has been said, the actinomycetes when cultured in broth gave "globe-colonies" of varying compactness. When transferred to solid media the more compact colonies gave rise to the more vigorous and persistent growths.

2. By growing cultures under conditions more favorable for their development. I refer here to frequent revival of the cultures by subculturing in media rich in nutrients, mainly serum media; egg media seem to be unsuitable. Cultures which, because of ageing (infrequent subculturing), produced lysogenic substances, appeared degraded, and tended to perish, could by frequent transfers on favorable media be restored to their original vigorous condition. This phenomenon I consider common for the entire genus *Actinomyces*.

3. By "revivification" of the entire culture. As has been said, because of lack of proper care my cultures often retrogressed to such an extent that further transfers gave no growth. I attempted to revive them by carefully adding sterile broth. This was done many scores of times. In only two instances I obtained a new growth that was far more vigorous than the original one, and appeared as a thick, compact film that split with difficulty. In the other instances when any success at all was obtained by this method the new growth was of about the same character as the original one.

4. The fourth method that I employed with success with one culture is so new and peculiar that I present here the protocol of the experiment. The observation was made in 1925.

OBSERVATION 5

By growing a culture of human tuberculosis on a richly alkalinized slice of carrot, prepared according to the method of Kumbary,(15) I obtained a strain of actinomycetes even more "degraded"[8] (that is, appearing softer and more unstable) than the one described in observation 1. It gave no growth at all on either plain potato or glycerin-potato media. In ordinary dextrose and glycerin agar, and also on Wassermann serum-nutrose-glycerin agar, it gave a growth that will be described later. In broth media its behavior was peculiar. In broth prepared by me personally[9] it either gave no growth or only a scant one, a very few transparent globe colonies, which soon dissolved altogether. In broth from the Mechnikov Institute the growth appeared as a limited number of large globes, or a large number of small ones, more compact than in my broth, that were usually seen at the bottom of the tube. In the first case the globes, within two to four days of their appearance, were either dissolved entirely or changed into a mucoid, adherent mass that on shaking was removed with difficulty from contact with the tube; this material also dissolved in the course of a few days. In the second case the globes rapidly grew along the side of the tube as if clinging to an invisible ladder, and within the first twenty-four hours usually reached the surface of the broth. There they showed a definite tendency to adhere more firmly to the glass and gave a ringlike or wheellike growth. However, this connection with the glass surface, as in observation 1, was very unstable and the slightest shaking of the tube was sufficient to cause all the globes and the upper wheel to separate and fall to the bottom of the tube. By the second day the growth had either dissolved entirely, or a part had dissolved while the rest formed a transparent mucoid mass that on vigorous shaking caused a grayish cloud. This soon gravitated again and dissolved in the course of a few

[8] I use this designation conditionally as yet, though I have justification for using it definitively.

[9] The laboratory in which I then worked was so short of assistants that I was obliged to prepare the media myself. At the same time I sometimes used, on permission of the director, media made in the Mechnikov Institute.

days. What caused the difference in behavior in the two lots of broth used I cannot say, but it may have been difference in alkalinity; my broth was 7.4 to 7.6 pH, while the other (according to Michaelis) was 7.0 to 7.2.

Transferred to the Kumbary carrot, on which it had originally been grown, the globes gave a very scant growth, which appeared as a soft, wrinkled, black-pigmented film. This quickly dissolved and left a corresponding black stain. On dextrose or glycerin agar the globes wrinkled up into small clumps of irregular form, around which on the following day there was a grayish, usually narrow, border forming an accurately circumscribed disk. This occupied, as if impregnating, the upper layers of the agar and produced from its lower surface (when the tube was in the horizontal position) a segment equal to from one-quarter to one-half of the globe that penetrated into the substratum. This tendency of the fungus to develop anaërobically in the substratum of the solid medium was puzzling, for it was contradictory to its tendency when in broth to grow upward to the surface, where it underwent further development; that is, revealed aërotaxis. On agar, on the other hand, the colony not only penetrated the medium but seemed as if pressed into it, for the disklike free surface seldom remained smooth but usually showed a rosette-shaped design on account of a number of small furrows that radiated peripherally from the clump lying in the center (remnants of the transplanted globe). The freshly grown colonies gave the impression of definite vitality, of ability to develop further, but on the day following their appearance they faded, becoming clearer and glasslike, and further cultures on the same medium gave no growth.

The same thing was seen on the Wassermann agar, except that the colonies were on the average much larger, were whiter, and seemed more compact and opaque, and clarification was less clearly seen. However, in subcultures there was no improvement in the viability of the growth, and for the purpose of preserving the culture this medium proved as useless as the sugar agar.

The surprising fragility and instability of this organism led me to an attempt to verify my old conception that these microbes can recover their former vigorous characteristics. The most promising method seemed to be frequent subculturing on media rich in nutrients. For this purpose, under existing circumstances, it was most convenient to use the Wassermann agar.

From a culture in dextrose broth, into which there was often added one-fourth to one-third of the Wassermann nutrose serum, I transferred the more compact globes to Wassermann agar. Because of the tendency of the globes to autolysis such subcultures had to be made from fresh cultures, from the first to the third day after the globes appeared. Two or three globes (whole globe, or at least a half one in each instance) were transferred to each tube and placed at a distance from each other. Though more than 150 such subcultures were made during the winter of 1925,[10] in not a single tube did the desired revival occur. The colonies that grew around the transferred clumps at first gave the impression of some vigor, but after two or three days they became paler, under the influence of dissolution that usually started from the center of the disk in the upper layers of the medium and extended down into the deeper layers of the colonies.

Parallel observations were then started with fluid media: Ordinary broth, glycerine broth, and especially dextrose broth (all from the Mechnikov Institute), both unmodified and with Wassermann nutrose serum. In spite of a great many subcultures, made almost daily (a total of 546 subcultures were made on solid and fluid media during the winter of 1925 and 1926), this method also gave no encouraging results. In the new media the globes became more resistant to dissolution, retaining their original characters for ten to fifteen days, but then they changed into homogeneous mucoid masses and sooner or later dissolved entirely, leaving an amorphous crumbly sediment.

These failures continued until I concentrated attention upon the fact that the ring of growth that developed against the tube wall at the surface, where it was best aërated, appeared to be more compact than the globes from which it originated. Assuming that the compactness might increase if this growth were left in place for a few days, I inoculated five sugar-broth tubes and left them in the thermostat for several days, protected from shaking. After five days there was found in three tubes a very compact surface pellicle, firmly adherent to the glass and covered by a thick layer of chalklike, spore-bearing down. In other words, the growth acquired, as further study revealed, all the characteristics of a "typical" culture of *Actinomyces*. This cul-

[10] Sixty experiments were made, and in each not less than two or three tubes were inoculated.

ture was designated "*Actinomyces N. 137.*" In the other tubes the film was drowned.

VI

The second question, that of pigment formation, I can touch on only slightly, as my observations on the matter were only incidental, made in connection with the numerous subcultures of actinomycetes that I have isolated.

The time has not yet passed when special practical significance has been assigned to pigment formation as a definite characteristic of one or another race of a particular microbic genus. An example is the classification of the staphylococci in accordance with their pigmentation, and the sarcinæ afford another. With regard to the large groups of the so-called paratuberculosis bacilli, the mycobacteria (the acid-fast saprophytes—butter and lacticola bacilli of Petri, Rabinovitch, Korn, and others, Möller's grass bacilli, and manure bacilli), it has been thought possible to distinguish the individual "representatives" by their cultural properties and pigment formation. However, it is now known that pigment formation in the mycobacteria is subject to most peculiar variations, and that the pigmented strains can change into nonpigmented ones and vice versa, just as pigmented bacteria of other kinds can be transformed—for example, the yellow sarcina into a white or orange form. Among the acid-fast saprophytes I have observed such profound changes within the same genus (referring to pigment formation and other cultural properties), that I am obliged to agree with the somewhat jocular remark of Frey and Hagan(7) that, in the museum collections of acid-fast cultures, ". . . as long as the labels remain on the tubes, one can distinguish these cultures, one from another, but if the label happens to be destroyed or lost, one would have no way of determining the identity of the culture."

There is no doubt in my mind that the same is true with regard to the actinomycetes. Their cultural properties are so changeable and unstable that to use them as a basis for distinguishing the mycotic organisms obtained—for example, from cultures of human tuberculosis or from organisms obtained from avian tuberculosis, or even from the organisms isolated from cultures of leprosy—is almost if not quite impossible. As regards pigment formation, its inconstancy and variability in the actinomycetes group are quite surprising. Pigment sometimes appears, sometimes disappears, sometimes changes into another

color, all this happening against the will of the person working with the organisms in the course of their routine subculturing. Most often I have observed the appearance of black and dark violet pigmentation, somewhat more seldom yellow, rose, and orange, still more seldom green, and only exceptionally red."

VII

The observations of Triuss and Politova(21) that have been referred to bring up a question of great importance, the relation of the actinomycetes isolated from cases of "banal" radiant mycotic diseases to the tuberculosis bacillus. At the same time my observations bring out the question of the relation of mycotic organisms isolated from tuberculosis material to those of similar nature isolated by me and other authors (Williams, Rost, Reenstierna, Bayon) from leprous lesions or from cultures of leprosy (Kedrowsky), as well as the correlation between the various types of tubercle bacilli (human, bovine, and avian). In short, a new chapter in microbiology is being opened up that so far has remained in almost complete oblivion, that of the correlation of individual representatives of the actinomycetes group isolated from various sources, not excluding the saprophytes. As yet this chapter is only in project, but one need not be a prophet to foretell that a study of these questions will enrich science. To me it seems that the new knowledge that will be acquired will lead, first, towards revision of modern conceptions regarding the epidemiology, if not of tuberculosis, in any case of leprosy.(14) At the same time the observations of Boulkin and Glouchovzev demonstrate that the actinomycetes isolated from leprous material may successfully be used for preparation of antigens for the diagnosis of leprosy.

The findings of Triuss and Politova are strikingly peculiar and unexpected, and at present can hardly be accepted without essential reservations, although they deserve special attention. However, the sixth experiment that they report is in line with my own experience. From the pus of a cold abscess that contained a scanty amount of acid-fast (tuberculosis) bacilli these authors isolated a strain of actinomycetes which caused disseminated miliary tuberculosis in a guinea pig. In smears from the internal organs of the animal there were found only acid-fast rods of the tubercle type. It is obvious that this experiment

" Red pigment was observed in a culture of actinomycetes isolated by my collaborator A. K. Boulkin directly from leprous material.

is fully analogous to my experience of inoculation of a rabbit with the actinomycetes isolated from a tuberculosis culture.

SUMMARY

1. There is no necessity to divide the group of "filamentous mycotic organisms" into streptothrices and actinomycetes. There exists only one large general group, which may be designated either *Actinomyces* or *Streptothrix*.

2. Besides the cultures of these organisms that may be characterized as "typical," there exist in this group many variant forms that differ both from the basic (typical) strain and from each other by their morphological, cultural, and possibly biochemical properties.

3. In the development of such variant forms, outside of dissociation of the main trunk, an important part is evidently played by lysogenic substances that are formed as the culture ages. The action of these substances can be observed microscopically in fresh preparations in a change of refraction in the filaments; in stained slides the dissolving threads stain either very poorly or not at all.

4. Some of these variants are so "weak" and "unstable" that they become dissolved very soon after growth has started. This can be clearly observed in fluid media. However, even such extremely "degraded" variants can be reverted to the original, "typical" state by different methods. The process of "dissociation" is therefore a reversible phenomenon.

5. The formation of pigment being a very unstable and inconstant function, it cannot serve as a basis for differentiation in this group or in that of the acid-fast saprophytic diphtheroids. Therefore, the designations of the old authors, as "*Actinomyces rosaceus, niger, violaceus, albidofuscus, polychromogenes*," etc., must be discarded.

6. The filaments of the actinomycetes, under conditions the nature of which is not yet quite clear, have the ability to break up into rod-shaped elements that can be isolated as individual cultures. Whether or not this represents what is known as "cyclogeny" or "periodicity in the life status" I cannot say, as I lack personal experience in that field.

7. Isolated in pure culture, the rods exhibit properties characteristic of the diphtheroid microbes, from which they have received the name "diphtherideen" or "diphtheroids."

8. On the basis of my observations and data already existing, I feel justified in making the general statement that a very

close genetic relationship exists between the actinomycetes and the diphtheroids.

9. The fact that the bacilli of tuberculosis and leprosy, supposedly or actually deprived of their acid-fastness, reveal all the characteristics of diphtheroid microbes, provides additional though indirect proof in favor of my old conception that tuberculosis and leprosy are diseases of mycotic origin.

10. Diphtheroids originating from a tuberculosis source can, by being cultured in milk, be transformed into an acid-fast condition, and in that state they cause typical manifestations of tuberculosis in experimental animals.

11. An actinomycete isolated from a tuberculosis culture "dissociated" in the body of the rabbit into acid-fast rods that caused lesions typical of tuberculosis.

12. I consider it more than probable that the Koch "bacilli" and the Hansen "bacilli" can change, while in the outside medium, into a more stable condition of a more highly differentiated, mycotic nature that stands nearer to the molds. The epidemiologic significance of this phenomenon, for tuberculosis and especially for leprosy, must be considered very great.

REFERENCES

1. Bayon, H. Leprosy: A perspective of the results of experimental study of the disease. Ann. Trop. Med. and Paras. 9 (1915).
2. Beresstnev, N. M. Actinomycosis and its causative germ. Moscow (1897). (In Russian.)
3. Boulkin, A. K. The leprous antigens and their significance for the diagnosis of leprosy. Trop. Med. and Vet. (1930) No. 10. (In Russian.)
4. Boulkin, A. K., and B. V. Glouchovzev. On the sero-diagnosis of leprosy. Sov. Vlestn. Venerol. and Dermatol. (1932) No. 3. (In Russian.)
5. Brullova, L. P. The action of radium rays on some strains of bacteria. Transactions, VIII All-Russian Congress of Bacteriologists and Epidemiologists. Leningrad (1924.)
6. Cache, A. De la culture du bacille de diphthérie croissant en fils ramifiés. Centralbl. f. Bakt. I 29: 975–980.
7. Frey, C. A., and W. A. Hagan. The distribution of acid-fast bacteria in soils. Journ. Inf. Dis. 40 (1931) 497.
8. Jensen, H. L. Contributions to our knowledge of the Actinomycetalis. Proc. Linn. Soc. New South Wales 56 (1931) part 2.
9. Karwacki, L. O Postaciach Rozwojowych Zarazka Gruzlicy. Warszawa (1933). Variations biologiques du virus tuberculeux. Varsovie (1934).
10. Kedrowsky, W. Ueber die Kultur der Lepraerreger. Zeitschr. f. Hyg. 37 (1901).

11. KEDROWSKY, W. Experimentelle Untersuchungen über die Lepraimpfungen bei Tieren. Zeitschr. f. Hyg. 66 (1910).
12. KEDROWSKY, W. Microbiology of the leprosy bacillus. Journ. Trop. Med. and Hyg. (1926).
13. KEDROWSKY, W. Variabilité des microbes du groupe acido-résistant. Rev. Tubere. 62 (1930) No. 8.
14. KEDROWSKY, W. Modern aspects of the epidemiology of leprosy. Internat. Journ. Lep. 3 (1935) 443.
15. KUMBARY, A. C. Hygiene and Sanitation 1 (1910). (In Russian.)
16. LIESKE, J. Morphologie und Biologie der Strahlenpilze. Leipzig (1921).
17. REENSTIERNA, J. Ueber die Kultivierbarkeit des Lepra-Erregers. Arch. f. Dermatol. 116 (1913).
18. ROST, E. Cited by Bayon.
19. SAVCHENKO, I. G. The bacillary pseudoactinomycosis. Russian Arch. Path. Clin. Med. and Bact. (1896) No. 2.
20. SPRIG. Studien über den Diphtheriebacillus. Zeitschr. f. Hygien. 42 (1903).
21. TRUSS, M., and E. POLITOWA. Zur Biologie der Erreger der Strahlenpilzkrankheit. Zentralbl. f. Bakt. I 120 (1931).
22. WILLIAMS, B. Leprosy: A new view of its bacteriology and treatment. Indian Med. Gaz. (May, 1911).

ILLUSTRATIONS

PLATE 1

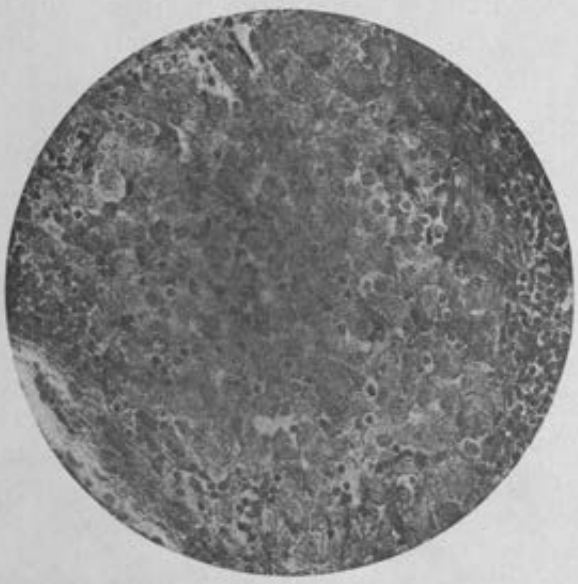
FIG. 1. Small nodule of epithelioid cells in submucosa of colon (1:300).

2. Larger tubercle with caseous degeneration in the center in submucosa of colon (1:150).

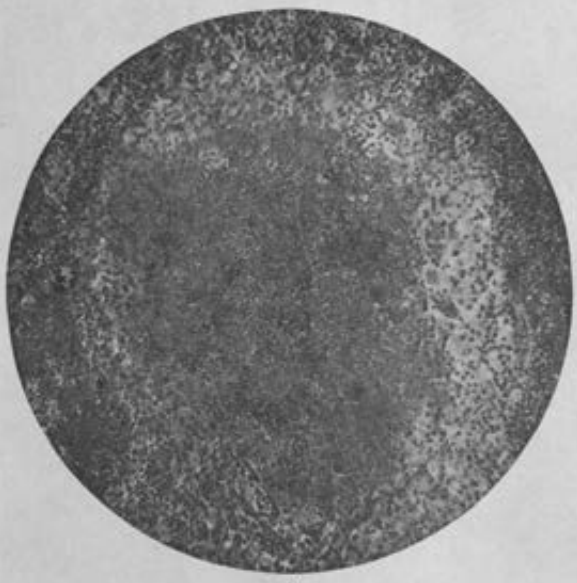
PLATE 2

FIG. 3. Tubercular islet with caseous degeneration in the peripheral part of the spinal cord (1:125).

4. Epithelioid nodule in the spinal root (1:300).



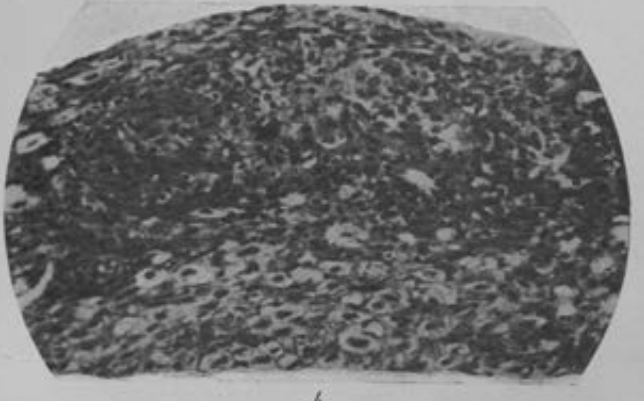
1



2

PLATE 1.

3



4

PLATE 2.

A CHECK LIST OF PHILIPPINE CRUSTACEAN DECAPODS

By Eulogio P. Estampador

Of the Northern Luzon Junior College, University of the Philippines Vigan, Ilocos Sur

INTRODUCTION

This work is primarily an attempt to survey the extent of the work done in the past on the systematic study on the Philippine carcinological fauna. At the same time, it may give an idea as to how much is yet to be done. The list is limited to the decapods, as very little has been done on the systematic study of the lower forms.

Of the 507 species included in this list, and distributed among 55 families and 195 genera, only 216 are in the collections of the University of the Philippines and the Bureau of Science. The remaining 291 species are not met with in the Philippines.

When all of the several hundreds of still unidentified specimens in the collection of both the University of the Philippines and the Bureau of Science are classified, and after extensive systematic surveying has been done, the number of species in the Philippine carcinological decapod fauna will undoubtedly be much greater than the number actually listed here.

Our present knowledge regarding our fauna is very meager. So far, no extensive systematic survey has been undertaken—neither by the government nor by private institutions. What we know of our carcinological fauna is the result of mere scrapings from here and there in a vast field that has hardly been touched. The species mentioned in the reports of such surveys as the Challenger Expedition, 1873–1876; the Voyage of H. M. S. Samarang, 1799–1877; the Siboga Expedition; the Exploration Expedition conducted by the U. S. Fisheries Steamer Albatross, were obtained from few places in the Philippines.

Active and persistent workers and investigators in this big and interesting group are still lacking. The few who are interested have had only limited time to give to this study. Among them were Doctor Cowles, former head of the Department of Zoölogy, University of the Philippines, whose work on Philippine palæmons is a distinct local contribution; Mr. Florencio

Talavera, who is responsible for the identification of most of the specimens in the collection of the Bureau of Science; Mr. Guillermo Blanco, of the same bureau, who has recently published a paper on Philippine Atyidæ [1]; Mr. Jose V. Yapchiongco, of the Department of Zoölogy, University of the Philippines, who has just completed his manuscript on Philippine Paguridea.

The species included in the list are in the collection of the Zoölogy Department, University of the Philippines; in the collection of the Fish and Game Administration, Bureau of Science; and a few are in the collection of the Northern Luzon Junior College at Vigan, Ilocos Sur. Specimens bearing tag numbers having a dash after the first digit as 0–56, belong to the Zoölogy Department, University of the Philippines; those whose tag numbers have no dash, like 0256, belong to the Bureau of Science. A few that do not bear tag numbers are in the collection of the Northern Luzon Junior College. Those that are reported only in foreign literatures are otherwise indicated.

ACKNOWLEDGMENT

This work was made possible through the kindness of Dr. Hilario A. Roxas, head of the Fish and Game Administration of the Bureau of Science. Doctor Roxas allowed me to go through the records and collection of the Bureau of Science and gave me all the help and facilities at his disposal. To Mr. Florencio Talavera, I owe very valuable help and suggestions.

SYSTEMATIC DISCUSSION

Various systems have been proposed for the classification of Macrura; namely, that of Latreille in 1831; that of Milne Edwards in 1837; that of de Haan in 1850; that of Dana in 1852; that of Heller in 1863; that of Claus in 1880; and that of Huxley in 1883.

The scheme of grouping followed in this paper regarding the Macrura is that of Spence Bate, which is a modification of those adopted by other authors. He proposed to divide Macrura into divisions, as follows:

Suborder MACRURA

Trichobranchiata—Dendrobranchiata—Phyllobranchiata—Anomobranchiata

The Trichobranchiata have the branchial plumes made up of long cylindrical filaments. The Phyllobranchiata have the

[1] Philip. Journ. Sci. 56 (1935) 1.

plumes formed by a series of foliaceous plates. The Trichobranchiata may be divided into two groups: (1) the Normalia, which have the most typical conditions, and (2) the Aberrantia, which depart more or less from the typical arrangement of the branchiæ as well as in the plan of the external structure and development.

The ovum as in Phyllobranchiata when extruded from the oviduct is attached to the pleopoda by a filamentous attachment and hatches either in the zœa, phyllosoma, or the megalopa stage.

The Dendrobranchiata differ from the other two divisions in anatomical structure, external form, development, and general habits, and may likewise be divided into a normal and an aberrant group. The branchial structure consists of series of plumes attached by, or very near, their basal extremity to the animal and from a long central stalk send off on each side a single row of branches that divide and subdivide in a more or less distinctly different manner in separate genera, and sometimes also in otherwise well-defined species. In the Dendrobranchiata the form of the brephalos is unknown. It is supposed to be that of a nauplius in the Penæidæ.

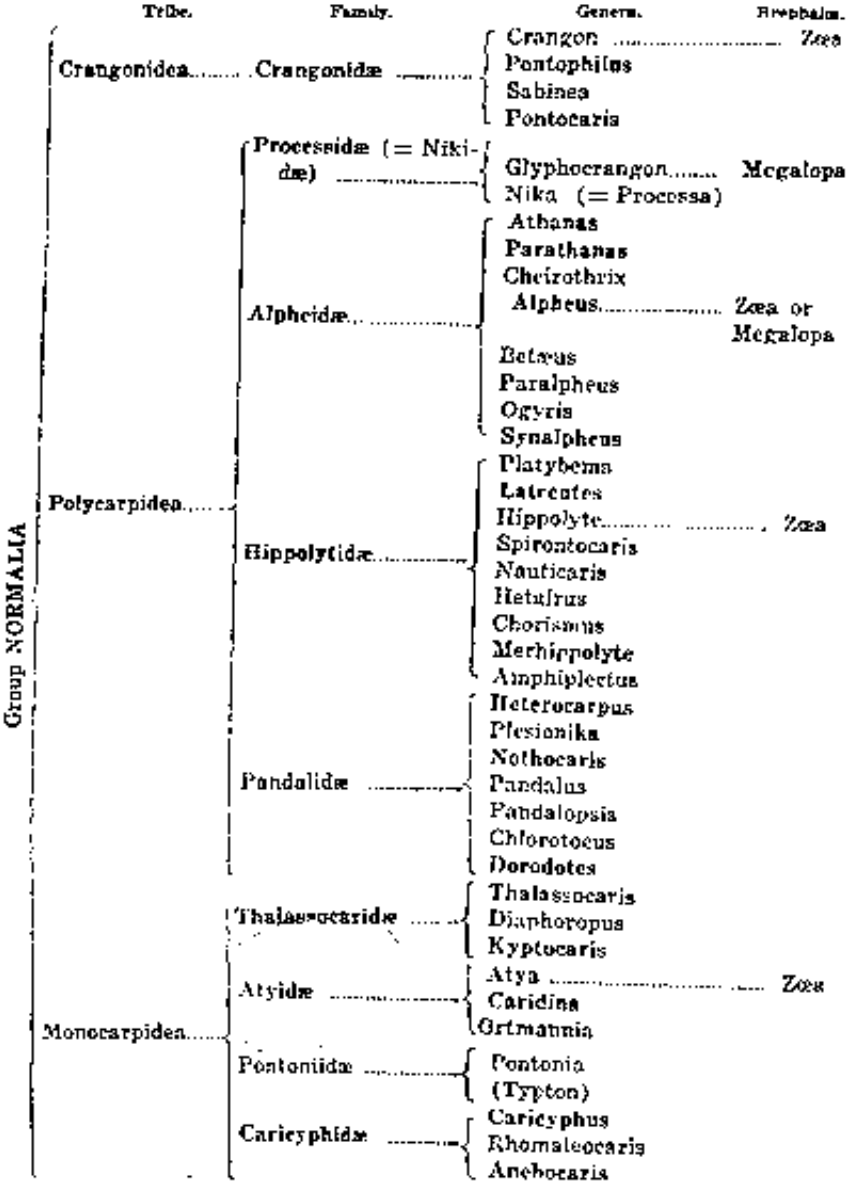
In the Phyllobranchiata the branchial plumes, which are in the form of broad foliaceous plates, are attached to a central stalk. The aberrant group of this division has long been distinguished by carcinologists under Anomura, but sometimes as a division of Macrura.[2]

[2] Challenger Report, Zool. 24 (1878–76).

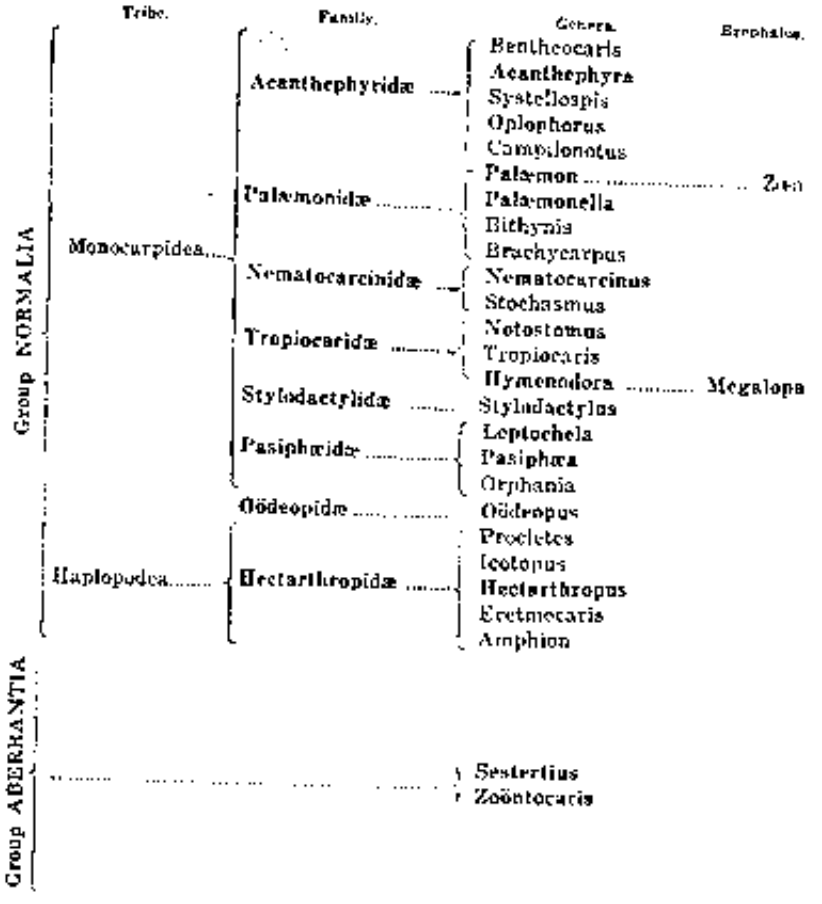
Order DECAPODA

Suborder MACRURA

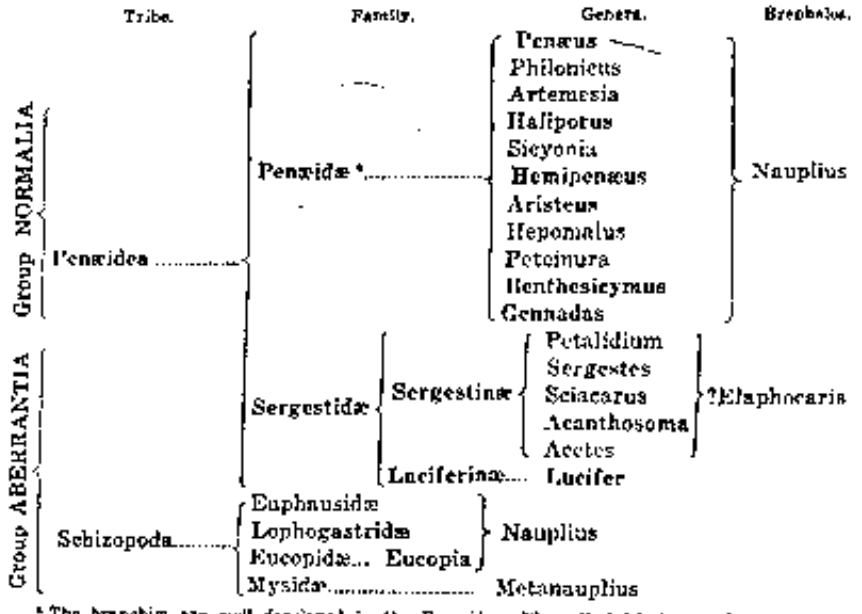
Division PHYLLOBRANCHIATA [3]



[3] The scheme of groupings adopted is that of Spence Bate in Challenger Report Vol. 24. The families and genera in boldface are represented in the Philippines.

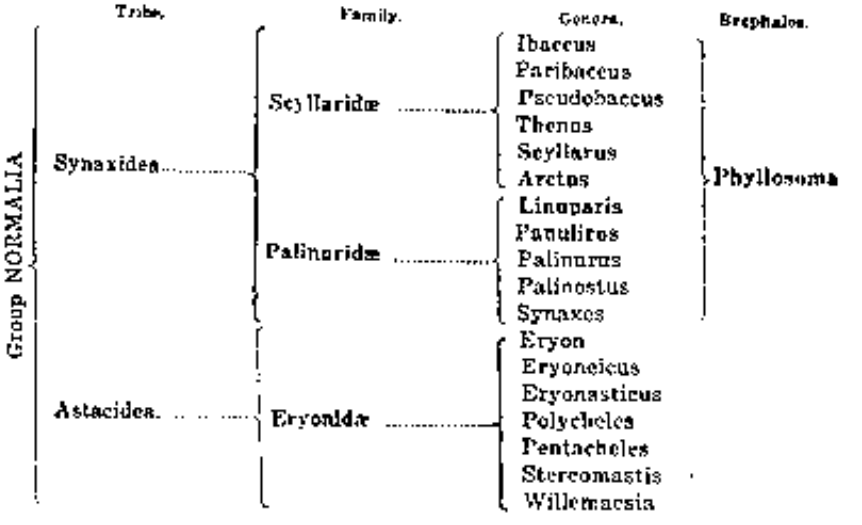

Tribe.
Family.
Genera.
Erroneous.
Group NORMALIA
Monocurpidea
Haplopodea
Group ABERRANTIA
Acanthephyridæ
Palæmonidæ
Nematocarcinidæ
Tropiocaridæ
Stylodactylidæ
Pasiphæidæ
Ödeopidæ
Hectarthropidæ
Bentheocaris
Acanthephyra
Systellaspis
Oplophorus
Campylonotus
Palæmon
Palæmonella
Bithynis
Brachycarpus
Nematocarcinus
Stochasmus
Notostomus
Tropiocaris
Hymenodora
Stylodactylus
Leptochela
Pasiphæa
Orphania
Ödeopus
Procletes
Icotopus
Hectarthropus
Eretmocaris
Amphion
Sestertius
Zoöntocaris
Zoea
Megalopa

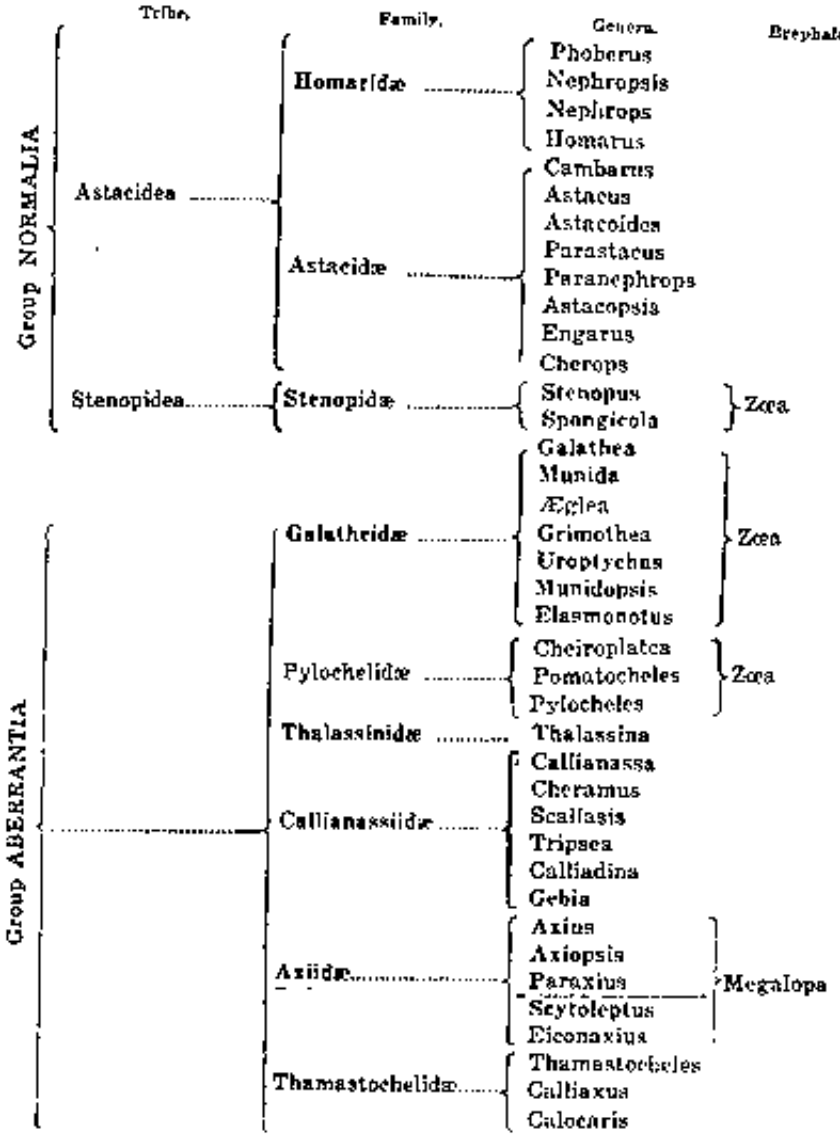
Division DENDROBRANCHIATA



* The branchiæ are well developed in the Penæidæ. They diminish in number and importance in the Sergestinæ and disappear in Lucifer.

Division TRICHOBRANCHIATA




Tribe.
Family.
Genera.
Brephalos.
Group NORMALIA
Astacidea
Homaridæ
Phoberus
Nephropsis
Nephrops
Homarus
Astacidæ
Cambarus
Astacus
Astacoides
Parastacus
Paranephrops
Astacopsis
Engarus
Cherops
Stenopidea
Stenopidæ
Stenopus
Spongicola
Zoea
Group ABERRANTIA
Galatheidæ
Galathea
Munida
Æglea
Grimothea
Uroptychus
Munidopsis
Elasmonotus
Zoea
Pylochelidæ
Cheiroplatea
Pomatocheles
Pylocheles
Zoea
Thalassinidæ
Thalassina
Callianassiidæ
Callianassa
Cheramus
Scallasis
Tripsea
Calliadina
Gebia
Axiidæ
Axius
Axiopsis
Paraxius
Scytoleptus
Eiconaxius
Megalopa
Thamastochelidæ
Thamastocheles
Calliaxus
Calocaris

A CHECK LIST OF PHILIPPINE CRUSTACEAN DECAPODS

A synoptic table of Philippine genera.

Suborder Macrura
Division Phyllobranchiata
Group Normalia
Tribe Crangonidea
Family Crangonidæ
Pontophilus
Tribe Polycarpidea
Family Processidæ
(= Nikidæ)
Processa (= *Nika*)
Family Alpheidæ
Alpheus
Parathanas
Ogyris
Synalpheus
Family Hippolytidæ
Latreutes
Family Pandalidæ
Doradotes
Nothocaris
Heterocarpus
Plesionika
Tribe Monocarpidea
Family Thalassocaridæ
Kyptocaris
Thalassocaris
Family Atyidæ
Atya
Ortmannia
Caridina
Family Caricyphidæ
Anebocaris
Caricyphus
Family Acanthephyridæ
Acanthephyra
Oplophorus
Family Palæmonidæ
Palæmon
Palæmonella
Family Nematocarcinidæ
Nematocarcinus
Family Tropiocaridæ
Notostomus
Hymenodora

Suborder Macrura—Continued
Division Phyllobranchiata—Continued
Group Normalia—Continued
Tribe Monocarpidea—Continued
Family Stylodactylidæ
Stylodactylus
Family Pasiphæidæ
Pasiphæa
Leptochela
Family Oödeopidæ
Oödeopus
Tribe Haplopodea
Family Hectarthropidæ
Hectarthropus
Group Aberrantia
Scetertius
Zoöntocaris
Division Dendrobranchiata
Group Normalia
Tribe Penæidea
Family Penæidæ
Penæus
Hemipenæus
Benthesicymus
Haliporus
Aristeus
Gennadas
Family Sergestidæ
Lucifer
Sergestes
Acanthosoma
Division Trichobranchiata
Group Normalia
Tribe Syncaridea
Family Scyllaridæ
Ibacchus
Scyllarus
Arctus
Thenus
Family Palinuridæ
Palinurus
Tribe Astacidea
Family Eryonidæ
Pentacheles
Family Homaridæ
Nephrops
Tribe Stenopidea
Family Stenopidæ
Stenopus
Spongicola

Suborder Macrura—Continued
Division Trichobranchiata—Continued
Group Aberrantia
Family Galatheidæ
Galathea
Munidopsis
Uroptychus
Munida
Elasmonotus
Family Thalassinidæ
Thalassina
Family Callianassiidæ
Callianassa
Gebia
Family Axiidæ
Axius
Scytoleptus
Axiopsis

Suborder Anomura
Tribe Paguridea
Family Paguridæ
Clibanarius
Aniculus
Calcinus
Paguristes
Pagurus
Diogenes
Eupagurus
Spiropagurus
Family Cœnobitidæ
Birgus
Cœnobita
Family Parapaguridæ
Pagurodes
Parapagurus
Paguropsis
Tribe Porcellanidea
Family Porcellanidæ
Petrolisthes
Pisisoma
Tribe Hippidea
Family Hippidæ
Remipes
Mastigochirus
Family Albuneidæ
Albunea

Suborder Brachyura
Tribe Homolidea
Family Latreillidæ
Latreillopsis
Latreillia

Suborder Brachyura—Continued
- Tribe Dromidea
  - Family Dromiidæ
    - *Dromia*
    - *Cryptodromia*
- Tribe Oxystomata
  - Family Raninidæ
    - *Ranina*
  - Family Leucosiidæ
    - *Leucosia*
    - *Pseudophilyra*
    - *Myra*
    - *Ixa*
    - *Arcania*
    - *Oreophorus*
    - *Philyra*
    - *Cryptocnemus*
    - *Myrodes*
    - *Iphiculus*
    - *Heterolithadia*
    - *Oreophorus*
  - Family Dorippidæ
    - *Dorippe*
    - *Ethusa*
  - Family Calappidæ
    - *Calappa*
  - Family Matutidæ
    - *Matuta*
- Tribe Cyclometopa
  - Family Corystidæ
    - *Gomeza*
  - Family Portunidæ
    - *Charybdis*
    - *Thalamitoides*
    - *Scylla*
    - *Podophthalmus*
    - *Thalamita*
    - *Neptunus*
    - *Lissocarcinus*
  - Family Xanthidæ
    - *Carpilius*
    - *Carpilodes*
    - *Lophactea*
    - *Atergatopsis*
    - *Xantho*
    - *Etisus*
    - *Actæa*
    - *Chlorodopsis*
    - *Xanthodes*
    - *Epixanthus*

Suborder Brachyura—Continued
Tribe Cyclometopa—Continued
Family Xanthidæ—Continued
Pilumnus
Trapezia
Liomera
Lophozozymus
Lophopanopeus
Atergatis
Leptodius
Etisodes
Chlorodius
Phymodius
Menippe
Baptozius
Eriphia
Quadrella
Family Potamonidæ
Potamon
Pseudotelphusa
Tribe Catometopa
Family Goneplacidæ
Carcinoplax
Goneplax
Typhlocarcinus
Chasmocarcinus
Prophetichus
Ceratoplax
Hephthopelta
Typhlocarcinops
Family Grapsidæ
Grapsus
Geograpsus
Metaosesarma
Varuna
Ptychognathus
Percnon
Metopograpsus
Sesarma
Helice
Utica
Plagusia
Family Gecarcinidæ
Cardisoma
Gecarcinus
Gecarcoidea
Family Ocypodidæ
Ocypode
Macrophthalmus

Suborder Brachyura—Continued
- Tribe Catometopa—Continued
  - Family Ocypodidæ—Continued
    - *Uca*
    - *Tympanomerus*
  - Family Pinnotheridæ
    - *Pinnotheres*
    - *Xenophthalmus*
    - *Xanthasia*
  - Family Myctiridæ
    - *Myctiris*
  - Family Palicidæ
    - *Palicus*
- Tribe Oxyrhyncha
  - Family Inachidæ
    - *Achæus*
    - *Camposcia*
    - *Echinoplax*
    - *Platymaia*
    - *Achæopsis*
    - *Menæthius*
    - *Huenia*
    - *Sphenocarcinus*
    - *Oncinopus*
    - *Inachus*
    - *Anamathia*
    - *Cyrtomaia*
    - *Oxyplecurodon*
    - *Pellinia*
    - *Pugettia*
    - *Doclea*
  - Family Majidæ
    - *Hyastenus*
    - *Naxioides*
    - *Pisa*
    - *Naxia*
    - *Maia*
    - *Schizophrys*
    - *Chorilia*
    - *Phalangipus*
    - *Egeria*
    - *Micippa*
    - *Leptomithrax*
    - *Paramithrax*
  - Family Periceridæ
    - *Pericera*
    - *Mithrax*
    - *Tiarinia*

Suborder Brachyura—Continued
Tribe Oxyrhyncha—Continued
Family Parthenopidæ
Parthenope
Daldorfia
Cryptopodia
Lambrus
Family Eumedomidæ
Ceratocarcinus
Zebrida
Harrovia

Order DECAPODA

Suborder MACRURA

Division PHYLLOBRANCHIATA

Group NORMALIA

Tribe CRANGONIDEA

CRANGONIDÆ

Genus PONTOPHILUS Leach

PONTOPHILUS GRACILIS Spence Bate.

Pontophilus gracilis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 489, pl. 87.

Near the Philippines; 2,150 fathoms; blue mud bottom (Challenger).

PONTOPHILUS JUNCEUS Spence Bate.

Pontophilus junceus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 491, pl. 88, figs. 2–4; BALSS, Macrura, Deutsch. Tiefsee Exped. 2 (1925) 206.

Between Philippines and Borneo, 250 fathoms; green mud bottom (Challenger).

PONTOPHILUS JAPONICUS Balss.

Pontophilus japonicus DE MAN, Decapoda, Siboga Exped. pt. IV 87 (1917) 285, pls. 23, 24, figs. 69–69*f*.

Sulu Sea, 150 to 285 fathoms, coral and stony bottom (Siboga).

PONTOPHILUS CHALLENGERI Ortmann.

Pontophilus challengeri DE MAN, Decapoda, Siboga Exped. pt. IV 87 (1917) 252.

Near the Philippines, 2,150 fathoms (Siboga).

Tribe POLYCARPIDEA

Family PROCESSIDÆ Ortmann

Genus PROCESSA

PROCESSA AUSTRALIENSIS Baker.

Processa australiensis BAKER, Notes on South Austral. Decapoda, Crust. pt. V, Trans. Royal Soc. South Austral. 31 (1907) 185, pl. 25, figs. 2–2*e*; DE MAN, Decapod. Siboga Exped. pt. IV 87 (1917) 199–203.

Sulu Archipelago, from a reef (Siboga).

PROCESSA sp.

Processa sp. DE MAN, Decapod. Siboga Exped. pt. IV 87 (1917) 203.

Sulu, Sulu harbor, 7 to 8 fathoms; sand bottom. (Siboga).

ALPHEIDÆ

Genus ALPHEUS Fabricius

ALPHEUS SPINIGER Stimpson.

Alpheus spiniger STIMPSON, Proc. Acad. Nat. Sci. Philad. (1860) 110; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 560, pl. 100.

Off Manila, 18 fathoms, blue mud bottom (Challenger).

ALPHEUS CRINITUS Dana.

Alpheus crinitus DANA, U. S. Explor. Exped. Crust. (1852) 548, pl. 34, fig. 8*a–f*; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 548, pl. 98, fig. 2; DE MAN, Decapod. Siboga Exped. pt. II 80 (1911) 357.

Off Zamboanga, on a reef, 18 fathoms; Balabac Passage (Dana).

ALPHEUS BIUNGUICULATUS Stimpson.

Alpheus biunguiculatus STIMPSON, Proc. Acad. Nat. Sci. Philad. (1860) 100; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 562, pl. 101, fig. 4.

Off Manila, 18 fathoms; blue mud bottom (Challenger).

ALPHEUS EDWARDSII var. LEVIUSCULUS Dana.

Alpheus edwardsii var. *leviusculus* DANA, U. S. Explor. Exped. Crust. (1852) 543, pl. 34, fig. 3; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 540, pl. 98, fig. 1.

Off Panay, 20 fathoms, blue mud bottom (Challenger).

ALPHEUS ACUTO-FEMORATUS Dana.

Alpheus acuto-femoratus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 540.

Balabac Passage (Dana).

ALPHEUS NEPTUNUS Dana.

Alpheus neptunus DANA, U. S. Explor. Exped. Crust. 1 (1852) 553, pl. 35, fig. 5; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 563, pl. 101.

Sulu Sea; 6 to 9 fathoms (Challenger).

ALPHEUS MITIS Dana.

Alpheus mitis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 540.

Balabac Passage, 1 fathom (Challenger).

ALPHEUS PARVIROSTRIS Dana.

Alpheus parvirostris DANA, U. S. Explor. Exped. Crust. (1852) 551, pl. 35, fig. 3; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 541; DE MAN, Decapoda Siboga Exped. pt. II 60 (1911) 432.

Alpheus lucifer MIERS, Ann. Mag. Nat. Hist. (4) 16 (1875) 343.

Sulu Archipelago, Tawitawi Island, Pulu Sanguisiapo, from a reef (Siboga).

ALPHEUS COLLUMIANUS Stimpson.

Alpheus collumianus STIMPSON, Proc. Acad. Nat. Sci. Philad. (1860) 30; DE MAN, Decapoda, Siboga Exped. pt. II 60 (1911) 334.

Sulu Archipelago, Tawitawi Island, Pulu Sanguisiapo, 12 m, sand and coral bottom (Siboga).

ALPHEUS MALLEODIGITUS (Spence Bate).

Betaeus malleodigitus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 565, pl. 101, fig. 5.

Alpheus malleodigitus DE MAN, Decapoda, Siboga Exped. pt. II 60 (1911) 347.

Southeast side of Pearl Bank, Sulu Archipelago; 15 m, lithothamnion bottom (Siboga).

ALPHEUS MALLEODIGITUS var. GRACILICARPUS de Man.

Alpheus malleodigitus var. *gracilicarpus* DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 349.

Sulu Archipelago, Tawitawi Island, Pulu Sanguisiapo, 12 m, lithothamnion bottom (Siboga).

ALPHEUS CONSOBRINUS de Man.

Alpheus consobrinus DE MAN, Notes Leyden Mus. 30 (1908) 101; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 360.

Southeast side of Pearl Bank, Sulu Archipelago (Siboga).

ALPHEUS FRONTALIS H. M. Edwards.

Alpheus frontalis H. M. EDWARDS, Hist. Nat. Crust. 2 (1837) 356; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 369.

Alpheus latifrons A. M. EDWARDS, Journ. des Mus. Godeffroy (1874) 11; DE MAN, Archiv. f. Naturg. 53 Jahrg. (1888) 521, pl. 32.

Sulu Archipelago, Tawitawi Island, Pulu Sanguisiapo, from a reef (Siboga).

ALPHEUS COUTIERI de Man.

Alpheus coutieri DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 409.

Southeast side of Pearl Bank, Sulu Archipelago; 15 m, lithothamnion bottom (Siboga).

ALPHEUS PAREUCHIRUS Coutiere.

Alpheus pareuchirus COUTIERE, Alpheidae, Maldive and Laccadive Archipelago (1905) 900, pl. 84, fig. 43; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 418.

Off Pulu Tongkil, Sulu Archipelago, 13 m, lithothamnion bottom (Siboga).

ALPHEUS PAREUCHIRUS var. LEUCOTHEA de Man.

Alpheus pareuchirus var. *leucothea* DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 420.

Off Pulu Tongkil, Sulu Archipelago, 13 m, lithothamnion bottom (Siboga).

ALPHEUS STRENUUS Dana.

Alpheus strenuus DANA, U. S. Explor. Exped. Crust. (1852) 543, pl. 34, fig. 4; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 425.
Alpheus labidens LANCHESTER, Proc. Zool. Soc. London (1900) 563.

Sulu Archipelago, Tawitawi Island, Pulu Sanguisiapo, from a reef (Siboga).

ALPHEUS PACIFICUS Dana.

Alpheus pacificus DANA, U. S. Explor. Exped. Crust. (1852) 544, pl. 34, fig. 5; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 427.
Alpheus gracilidigitus MIERS, Rept. Voy. H. M. S. "Alert" (1884) 287.

Sulu Archipelago, Tawitawi Island, Pulu Sanguisiapo, from a reef (Siboga).

ALPHEUS HIPPOTHOE de Man.

Alpheus hippothoë DE MAN, Journ. Linn. Soc. London 22 (1888) 268, pl. 17, figs. 1–5; HENDERSON, Trans. Linn. Soc. Zoöl. II 5 (1893) 430; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 433.

Sulu, Sulu harbor, 14 m, sandy bottom (Siboga).

ALPHEUS ALCYONE de Man (charact. emend.).

Alpheus alcyone DE MAN, Abhandl. Senckenberg. Naturf. Gesell. 25 (1902) 870, pl. 27, fig. 61; NOBILI, Bul. Sci. France et Belgique 40 (1906) 32; DE MAN, Decapod. Siboga Exped. pt. 2 60 (1911) 351.
Alpheus aculeipes COUTIERE, Alpheidae, Maldive and Laccadive Archipelago (1905) 892.

Sulu Archipelago, off north Ubian, 16 m, lithothamnion bottom (Siboga).

ALPHEUS PARALCYONE Coutiere.

Alpheus paralcyone COUTIERE, Alpheidae, Maldive and Laccadive Archipelago (1905) 895, pls. 80, 81, fig. 34; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 354.

Sulu Archipelago, off north Ubian, 16 m, lithothamnion bank (Siboga).

ALPHEUS BICOSTATUS de Man.

Alpheus bicostatus DE MAN, Notes Leyden Mus. 30 (1908) 102; Decapoda, Siboga Exped. pt. II 60 (1911) 375.

Sulu Archipelago, off north Ubian, 16 m, lithothamnion bank (Siboga).

ALPHEUS MIERSI Coutiere.

Alpheus rapax var. *miersi* COUTIERE, Bul. Soc. Entom. France (1898) 166.

Alpheus miersi COUTIERE, Alpheidae, Maldive and Laccadive Archipelago (1905) 903, pls. 83, 84, fig. 42; DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 393.

Sulu Archipelago, off north Ubian, 16 m, lithothamnion bank (Siboga).

ALPHEUS PACHYCHIRUS Stimpson.

Alpheus pachychirus STIMPSON, Proc. Acad. Nat. Philad. (1860) 30; DE MAN, Decapod. Siboga Exped. pt. 2 60 (1911) 366; H. A. ROXAS, Rept. Puerto Galera Marine Biol. Lab. List of Anim. (1930) 16.

MINDORO, Mindoro, Puerto Galera, 0–427.

Genus SYNALPHEUS Spence Bate

SYNALPHEUS NEOMERIS (de Man).

Alpheus neomeris DE MAN, Zoöl. Jahrb. Abth. Syst. 9 (1897) 734.

Synalpheus neomeris NOBILI, Bul. Sci. France et Belgique 40 (1906) 25; DE MAN, Decapod. Siboga Exped. pt. 2 60 (1911) 212.

Sulu Archipelago, Southeast side of Pearl Bank, 15 m, lithothamnion bottom (Siboga).

SYNALPHEUS FOSSOR var. PROPINQUA de Man.

Synalpheus fossor var. *propinqua* DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 250.

Sulu Archipelago, southeast side of Pearl Bank, 15 m, lithothamnion bottom (Siboga).

SYNALPHEUS CARINATUS var. UBIANENSIS de Man.

Synalpheus carinatus var. *ubianensis* DE MAN, Decapod. Siboga Exped. pt. II 60 (1911) 212.

Sulu Archipelago, off north Ubian, 16 m, lithothamnion bottom (Siboga).

SYNALPHEUS PESCADORENSIS Coutiere.

Synalpheus pescadorensis COUTIERE, Alpheidae, Maldive and Laccadive Archipelago (1905) 877, pl. 73, fig. 15; DE MAN, Decapoda, Siboga Exped. pt. II 60 (1911).

Southeast side of Pearl Bank, Sulu Archipelago, 15 m, lithothamnion bottom (Siboga).

Genus OGYRIS Stimpson

OGYRIS SIBOGÆ de Man.

Ogyris sibogæ DE MAN, Tijdschr. d. Ned. Vereen (2) 11 (1910) 318; Decapod. Siboga Exped. pt. II 60 (1911) 3.

Sulu Sea; 500 m, fine yellow sand bottom (Siboga).

Genus PARATHANAS Spence Bate

PARATHANAS IMMATURUS Spence Bate.

Parathanas immaturus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 532.

Cebu, Cebu Harbor, from plankton (Challenger).

PARATHANAS DECORTICUS Spence Bate.

Parathanas decorticus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 530, pl. 89, fig. 3.

Off Sibago, Zamboanga, 80 fathoms (Challenger).

HIPPOLYTIDÆ

Genus LATREUTES Stimpson

LATREUTES PLANUS Spence Bate.

Latreutes planus SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 584, pl. 89, fig. 5.

Off Sibago, Zamboanga Province.

LATREUTES UNIDENTATUS Spence Bate.

Latreutes unidentatus SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 580, pl. 89, fig. 6.

Off Sibago, Zamboanga Province.

Family PANDALIDÆ Spence Bate

Genus HETEROCARPUS A. M. Edwards

HETEROCARPUS GIBBOSUS Spence Bate.

Heterocarpus gibbosus SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 634, pl. 112, fig. 2; DE MAN, Decapoda Siboga Exped. pt. II 87 (1920) 163, pl. 14, fig. 39; BALSS, Macrura, Deutsch. Tiefsee Exped. 2 (1925) 287.

Off Tablas, 700 fathoms, blue mud bottom (Challenger).

HETEROCARPUS ALPHONSI Spence Bate.

Heterocarpus alphonsi SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 632, pl. 112, fig. 1.

South of the Philippines, 500 fathoms, blue mud bottom.

HETEROCARPUS ENSIFER A. M. Edwards.

Heterocarpus ensifer A. M. EDWARDS, Ann. Sci. Nat. VI Art. 4 11 (1861) 8; SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 638, pl. 112, fig. 4.

Pandalus carinatus SIDNEY SMITH, Bull. Mus. Comp. Zoöl. 10 (1882) 63, pl. 10, figs. 2–2 f, pl. 11, figs. 1–3.

Between the Philippines and Borneo, 250 fathoms, green mud bottom (Challenger).

HETEROCARPUS ENSIFER var. **PARVISPINA** de Man.

Heterocarpus ensifer var. *parvispina* DE MAN, Decapoda, Siboga Exped. 87 (1920) 167.

North of Sulu, 150 fathoms.

Genus DORODOTES Spence Bate

DORODOTES REFLEXUS Spence Bate.

Dorodotes reflexus SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 678, pl. 116, fig. 3; ALCOCK, Descript. Cat. Indian Deep Sea Crust. Calcutta (1901) 109; DE MAN, Decapoda, Siboga Exped. 87 (1920) 152.

Off Luzon, 1,050 fathoms, blue mud bottom (Challenger).

Genus PLESIONIKA Spence Bate

PLESIONIKA BREVIROSTRIS Spence Bate.

Plesionika brevirostris SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 650, pl. 113, fig. 5.

Between the Philippines and Borneo, 250 fathoms, green mud bottom.

PLESIONIKA SEMILÆVIS Spence Bate.

Plesionika semilævis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 644, pl. 113, fig. 3.

Plesionika martia var. *semilævis* DE MAN, Decapoda, Siboga Exped. 87 (1920) 116, pl. 10, figs. 24–24b.

Plesionika martia BALSS, Macrura, Deutsch. Tiefsee Exped. 2 (1925) 278.

Between the Philippines and Borneo, 250 fathoms, green mud bottom. The Siboga specimen was collected from Sulu Sea, 450 fathoms, dead coral bottom (Challenger).

PLESIONIKA SINDOI (Rathbun).

Pandalus sindoi RATHBUN, U. S. Fish Comm. Bull. for 1903 (1906) 915, pl. 21, fig. 4.

Plesionika sindoi DE MAN, Decapoda, Siboga Exped. pt. IV 87 (1920) 126, pls. 11, 12, figs. 27–27e.

Sulu Sea, 150 fathoms, stony bottom (Siboga).

Genus NOTHOCARIS Spence Bate

NOTHOCARIS OCELLUS Spence Bate.

Nothocaris ocellus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 657, pl. 114, fig. 3.

Near Zamboanga, 82 fathoms, stone and gravel bottom.

Tribe MONOCARPIDEA

THALASSOCARIDÆ

Genus KYPTOCARIS Spence Bate

KYPTOCARIS STYLOFRONTALIS Spence Bate.

Kyptocaris stylofrontalis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 690, pl. 121, fig. 1.

Off SIBAGO, Zamboanga Province; from the surface.

Genus THALASSOCARIS Stimpson

THALASSOCARIS CRINITA (Dana).

Regulus crinitus DANA, U. S. Explor. Exped. Crust. (1852) 599, pl. 39, fig. 6*a–h*.

Thalassocaris crinitus BALSS, Ostasiatische Decapoden II, München (1914) 28.

Thalassocaris crinita DE MAN, Decapoda, Siboga Exped. 87 (1920) 95, pl. 9, figs. 22–22*c*.

Sulu Archipelago, Tawitawi Island, Pulu Sanguisiapo, sand and coral bottom (Siboga).

ATYIDÆ

Genus ATYA Leach

ATYA MOLUCCENSIS de Haan.

Atya moluccensis DE HAAN, Fauna Japon. Crust. (1849) 184, pl. 21.

Atya armata MILNE EDWARDS, Ann. Soc. Ent. de France (1864) 149, pl. 3, fig. 3.

Atya gustavi ORTMANN, Zool. Jahrb. Syst. 8 (1890) 467, pl. 36, figs. *a–c*.

LUZON, Bataan Province, Mariveles, 0–1372. MINDORO, Malayas River, 0270.

ATYA SERRATA Spence Bate.

Atyoida taitensis STIMPSON, Proc. Acad. Nat. Sci. Philad. (1860) 97.

Atya serrata SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 669, pl. 119, fig. 2; ORTMANN, Proc. Acad. Nat. Sci. Philad. (1895) 410; BLANCO, Philip. Journ. Sci. 56 (1935) 31, pl. 1, figs. 1–4.

Atya brevirostris DE MAN, Zool. Ergeb. (1892) 360, pl. 21, fig. 21.

MINDORO, Malayas River, 0271. LUZON, Ilocos Norte, Laoag River.

Genus CARIDINA Milne Edwards

CARIDINA GRACILLIMA Lanchester.

Caridina gracillima LANCHESTER, Proc. Zool. Soc. London (1901) 560, pl. 34, fig. 1; BLANCO, Philip. Journ. Sci. 56 (1935) 32, pl. 1, figs. 5–10.

LUZON, Ilocos Norte Province, Laoag, Canoacan River.

CARIDINA GRACILIROSTRIS de Man.

Caridina gracilirostris DE MAN, Zool. Ergeb. (1892) 390, pl. 25, fig. 31; NOBILI, Ann. Mus. Civ. St. Nat. Genova II 20 (1900) 477; BLANCO, Philip. Journ. Sci. 56 (1935) 32, pl. 2, figs. 11–17.

LUZON, Laguna Bay. Specimen in the Bureau of Science.

CARIDINA NILOTICA var. BRACHYDACTYLA de Man.

Caridina nilotica var. *brachydactyla* DE MAN, Rec. Ind. Mus. 2 (1908) 269, pl. 20, fig. 8; BLANCO, Philip. Journ. Sci. 56 (1935) 33, pl. 2, fig. 18.

Caridina brachydactyla subsp. *peninsularis* KEMP, Mem. Asiat. Soc. Bengal 6 (1918) 270, fig. 10.

LUZON, Ilocos Norte Province, Laoag, Canoacan River. Specimen in the Bureau of Science.

CARIDINA MODIGLIANI Nobili.

Caridina modigliani NOBILI, Ann. Mus. Civ. Stor. Nat. Genova 20 (1900) 477; BOUVIER, Bul. Scient. de Fr. et Belg. 39 (1905) 72; BLANCO, Philip. Journ. Sci. 56 (1935) 34, pl. 2, figs. 19–24.

LUZON, Ilocos Norte Province, Laoag River. Specimen in the Bureau of Science.

CARIDINA BREVICARPALIS var. ENDEHENSIS de Man.

Caridina brevicarpalis var. *endehensis* DE MAN, Zool. Niederlandisch Ost. Indien (1892) 399, pl. 24, figs. 30c–e; BLANCO, Philip. Journ. Sci. 56 (1935) 34, pl. 2, fig. 25.

LUZON, Batangas Province, Pancipit River. Specimen in the Bureau of Science.

CARIDINA LÆVIS Heller.

Caridina lævis HELLER, Verh. Zool. Bot. Ges. Wien 12 (1862) 411; DE MAN, Zool. Ergeb. (1892) 376, pl. 22, fig. 27; BOUVIER, Trans. Linn. Soc. London II 15 (1913) 464; BLANCO, Philip. Journ. Sci. 56 (1935) 34, pl. 2, figs. 26–32.

LUZON, Albay Province, Pulangue Lake. Specimen in the Bureau of Science.

Genus ORTMANNIA Rathbun

ORTMANNIA sp.

Ortmannia sp. BLANCO, Philip. Journ. Sci. 56 (1935) 36, pl. 3, figs. 33–40.

LUZON, Ilocos Norte Province, Canoacan River. Specimen in the Bureau of Science.

CARICYPHIDÆ

Genus CARICYPHUS Spence Bate

CARICYPHUS TURGIDUS Spence Bate.

Caricyphus turgidus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 717, pl. 121, fig. 5.

China Sea, off LUZON, on surface.

CARICYPHUS CORNUTUS Spence Bate.

Caricyphus cornutus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 712, pl. 121, fig. 2.

Philippines, near Zamboanga Province, on surface.

Genus ANEBOCARIS Spence Bate

ANEBOCARIS QUADROCULUS Spence Bate.

Anebocaris quadroculus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 722, pl. 123, fig. 1.

CEBU, Cebu harbor; Basilan Strait.

Family ACANTHEPHYRIDÆ Spence Bate

(=Hoplophoridæ de Man)

Genus ACANTHEPHYRA A. M. Edwards

ACANTHEPHYRA LONGIDENS Spence Bate.

Acanthephyra longidens SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 375, pl. 124, fig. 4.

Near the Philippines, 2,150 fathoms; blue mud bottom (Challenger). This species is regarded as identical with *A. microphthalma* S. I. Smith 1885.*

ACANTHEPHYRA MEDIA Spence Bate.

Acanthephyra media SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 736, pl. 124, fig. 5; DE MAN, Decapoda, Siboga Exped. 87 (1920) 45.

Off Tablas, 700 fathoms, blue mud bottom (Challenger).

ACANTHEPHYRA ACUTIFRONS Spence Bate.

Acanthephyra acutifrons SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 749, pl. 126, fig. 3; BALSS, Macrura, Deutsche Tiefsee Exped. 2 (1925) 261.

South of the Philippines, 500 fathoms, blue mud bottom (Challenger).

ACANTHEPHYRA BRACHYTELSONIS Spence Bate.

Acanthephyra brachytelsonis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 763, pl. 126, fig. 7; WOOD-MASON and A. ALCOCK, Ann. Mag. Nat. Hist. VI 9 (1892) 362.

Acanthephyra eximia var. *brachytelsonis* DE MAN, Decapoda, Siboga Exped. 87 (1920) 55.

South of the Philippines, 500 fathoms, blue mud bottom (Challenger).

ACANTHEPHYRA ROSTRATA (Spence Bate).

Acanthephyra rostrata DE MAN, Decapoda, Siboga Exped. 87 (1920) 45.

Philippines, 1,050 fathoms (Siboga).

Genus OPLOPHORUS M. Edwards

(=*Hoplophorus* H. M. Edwards)

OPLOPHORUS BREVIROSTRIS Spence Bate.

Oplophorus brevirostris SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 766, pl. 127, fig. 3.

Hoplophorus typus BALSS, Macrura, Deutsche Tiefsee Exped. 2 (1925) 248.

Off Tablas, 700 fathoms, blue mud bottom (Challenger).

* Siboga 87 (1920) 45.

Family PALÆMONIDÆ Spence Bate

Genus PALÆMON Fabricius

PALÆMON LANCEIFRONS Dana.

Palæmon lanceifrons DANA, U. S. Explor. Exped. Crust. (1852) 589, pl. 38, fig. 13; COWLES, Philip. Journ. Sci. 9 (1914) 364–371, pl. 2, figs. 4, 4*a*.

LUZON, Manila market, San Juan River, 0–54.

PALÆMON LANCEIFRONS var. MONTALBANENSIS Cowles.

Palæmon lanceifrons var. *montalbanensis* COWLES, Philip. Journ. Sci. 9 (1914) 371–379, pl. 2, figs. 6, 6*a–i*.

LUZON, Rizal Province, Montalban River.

PALÆMON LAR Fabricius.

Palæmon lar FABRICIUS, Suppl. Entom. Syst. p. 402; OLIVIER, Encyclop. 8 : 659; MILNE EDWARDS, Hist. Nat. Crust. 2 : 397; COWLES, Philip. Journ. Sci. 9 (1914) 371–379, pl. 2, figs. 7, 7*a–k*.

Bithynis lar SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 789, pl. 129, fig. 1.

MINDORO, Mindoro Province, Puerto Galera, 0–79. LUZON, Bataan Province, Mariveles, 0–1542; Rizal Province, San Juan del Monte, 0–1554.

PALÆMON JAROENSIS Cowles.

Palæmon jaroensis COWLES, Philip. Journ. Sci. 9 (1914) 385–389, pl. 3, figs. 8, 8*a–k*.

LEYTE, Jaro, 0–1556.

PALÆMON LEPIDACTYLUS Hilgendorf.

Palæmon lepidactylus COWLES, Philip. Journ. Sci. 9 (1914) 389–392, pl. 3, figs. 9, 9*a–b*.

LUZON, Bataan Province, Sisiman, Tietic, 0–417.

PALÆMON LATIDACTYLUS Thallwitz.

Palæmon latidactylus COWLES, Philip. Journ. Sci. 9 (1914) 392–397, pl. 3, figs. 10, 10*a–b*.

SAMAR, Gandara, 0–71. LUZON, Bataan Province, Mariveles, 0–1543; LEYTE, Jaro, 0–1500; MINDANAO, Agusan, 0–1451.

PALÆMON CARCINUS Fabricius.

Palæmon carcinus FABRICIUS, Suppl. Entom. p. 402; DE MAN, Journ. Linn. Soc. London 20 (1888) 280; COWLES, Philip. Journ. Sci. 9 (1914) 334–340, pl. 1, figs. 1, 1*a–j*.

LUZON, Rizal Province, San Juan River, 0–70. MINDORO, Lake Naujan, 0–1047.

PALÆMON PHILIPPINENSIS Cowles.

Palæmon philippinensis COWLES, Philip. Journ. Sci. 9 (1914) 340–355, pl. 2, figs. 2, 2*a–m*.

LUZON, Rizal Province, San Juan River, 0–108.

PALÆMON SUNDAICUS Heller.

Palæmon sundaicus HELLER, Sitz.-Ber. Akad. Wiss. Wien 45 (1862) 415, pl. 2, figs. 38, 39; COWLES, Philip. Journ. Sci. 9 (1914) 355–364 pl. 2, figs. 3, 3*a–f*.

Quite abundant in Laguna Bay. Commonly sold in Manila markets.

PALÆMON IDÆ Heller.

Palæmon idæ HELLER, Sitz.-Ber. Akad. Wiss. Wien 45 (1862) 416, pl. 2, figs. 40, 41; MARTENS, Archiv. f. Naturg. Jahrg. 34 1 (1862) 39; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 5 (1891) 717.

LUZON, Laguna Bay; Camarines Sur (von Martens).

PALÆMON GRANDIMANUS Randall.

Palæmon grandimanus RANDALL, Journ. Acad. Nat. Sci. Philad. 8 (1839) 142; DANA, U. S. Explor. Exped. Crust. (1852) 588, pl. 38, fig. 12; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 6 (1891) 736.

Bithynis grandimanus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 793, pl. 129, figs. 2, 3.

Philippines (von Martens).

PALÆMON LATIMANUS Martens.

Palæmon latimanus MARTENS, Archiv. f. Naturg. Jahrg. 34 1 (1868) 44; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 5 (1891) 737, pl. 47, figs. 11, 11*z*.

SAMAR (von Martens).

Genus PALÆMONELLA Dana

PALÆMONELLA ORIENTALIS Dana.

Palæmonella orientalis DANA, U. S. Explor. Exped. Crust. (1852) 582, pl. 38, fig. 4*a–d*; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 787, pl. 128, fig. 4.

Off SIBAGO, 250 fathoms, blue mud bottom (Challenger).

Family NEMATOCARCINIDÆ Spence Bate

Genus NEMATOCARCINUS A. M. Edwards

NEMATOCARCINUS ALTUS Spence Bate.

Nematocarcinus altus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 809, pl. 132, fig. 4.

South of the Philippines, 2,150 fathoms, blue mud bottom.

NEMATOCARCINUS UNDULATIPES Spence Bate.

Nematocarcinus undulatipes SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 801, pl. 130.

Off SIBAGO, 250 fathoms, blue mud bottom.

NEMATOCARCINUS TENUIROSTRIS Spence Bate.

Nematocarcinus tenuirostris SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 817, pl. 132, fig. 10; BALSS, Macrura, Deutsche Tiefsee Exped. 2 (1925) 273.

South of the Philippines, 500 fathoms, blue mud bottom (Challenger).

NEMATOCARCINUS PRODUCTUS Spence Bate.

Nematocarcinus productus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 810, pl. 132, fig. 5.

Off Luzon, 1,050 fathoms, blue mud bottom. This species is identical with *N. ensifer* var. *producta* of de Man.[1]

TROPIOCARIDÆ

Genus NOTOSTOMUS A. M. Edwards

NOTOSTOMUS PATENTISSIMUS Spence Bate.

Notostomus patentissimus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 826, pl. 134, figs. 1, 2; DE MAN, Decapoda, Siboga Exped. 87 (1920) 46.

South of the Philippines, 2,150 fathoms, blue mud bottom (Challenger). Balss[2] placed the genus *Notostomus* under Family Hoplophoridæ. Dr. J. G. de Man[3] placed it under the same family together with the genus *Hymenodora*.

NOTOSTOMUS PERLATUS Spence Bate.

Notostomus perlatus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 831, pl. 135, fig. 2; BALSS, Macrura, Deutsche Tiefsee Exped. 2 (1925) 268.

Near the Philippines, 2,150 fathoms, blue mud bottom (Challenger).

Genus HYMENODORA G. O. Sars

HYMENODORA ROSTRATA Spence Bate.

Hymenodora rostrata SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 846, pl. 136, fig. 4.

Off LUZON, 1,050 fathoms, blue mud bottom.

HYMENODORA GLAUCA Spence Bate.

Hymenodora glauca SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 847, pl. 137, fig. 1; DE MAN, Decapoda, Siboga Exped. 87 (1920) 47.

South of the Philippines, 2,550 fathoms (Challenger).

STYLODACTYLIDÆ

Genus STYLODACTYLUS A. M. Edwards

STYLODACTYLUS SIBOGUE de Man.

Stylodactylus sibogue DE MAN. Decapoda, Siboga Exped. pt. IV 87 (1920) 38, pl. 5, figs. 10–10c.

Sulu Sea, 285 fathoms, stony bottom.

[1] Siboga Exped. 87 (1920).
[2] Macrura Deutsche Tiefsee Exped. 1925.
[3] Siboga Exped. 87 (1920).

PASIPHÆIDÆ

Genus PASIPHÆA Savigny

PASIPHÆA PROPINQUA de Man.

Pasiphæa propinqua DE MAN, Decapoda, Siboga Exped. pt. 4 87 (1920) 7, pl. 1, figs. 1, 1*j*.

Near SULU, 245 fathoms, coral bottom.

PASIPHÆA sp.

Pasiphæa sp. DE MAN, Decapoda, Siboga Exped. pt. 4 87 (1920) 11, pls. 1, 2, figs. 4–4*p*.

Off SULU, 275 m, coral bottom.

Genus LEPTOCHELA Stimpson

LEPTOCHELA ROBUSTA Stimpson.

Leptochela robusta SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 862, pl. 132, figs. 3, 4; RATHBUN, U. S. Fish Comm. Bul. for 1903, pt. III, Wash. (1905) 929; DE MAN, Decapoda, Siboga Exped. pt. IV 87 (1920) 19, pls. 3, 4, figs. 7–7*z*.

Sulu Archipelago, 7 fathoms (Siboga).

OÖDEOPIDÆ

Genus OÖDEOPUS Spence Bate

OÖDEOPUS SERRATUS Spence Bate.

Oödeopus serratus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 877, pl. 142, figs. 2, 3.

Off Sibago Island, Zamboanga.

Tribe HAPLOPODEA

HECTARTHROPIDÆ

Genus HECTARTHROPUS Spence Bate

HECTARTHROPUS EXILIS Spence Bate.

Hectarthropus exilis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 889, pl. 144, fig. 2.

Cebu harbor; off Basilan Strait.

HECTARTHROPUS EXPANSUS Spence Bate.

Hectarthropus expansus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 892, pl. 144, figs. 4, 5.

Off Basilan Strait, on surface.

Group ABERRANTIA*

Genus SESTERTIUS Spence Bate

SESTERTIUS DUPLICIDENTES Spence Bate.

Sestertius duplicidentes SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 477, pl. 85, fig. 5.

Off Sibago.

Genus ZOÖNTOCARIS Spence Bate

ZOÖNTOCARIS APPROXIMUS Spence Bate.

Zoöntocaris approximus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 475, pl. 85, fig. 4.

Off Mindanao; on surface.

Division DENDROBRANCHIATA

Group NORMALIA

Tribe PENÆIDEA

Family PENÆIDÆ Spence Bate

Genus PENÆUS Fabricius

PENÆUS MONODON Fabricius.

Penæus monodon FABRICIUS, Suppl. Syst. p. 408; MILNE EDWARDS, Hist. Nat. Crust. 2 : 416.

Penæus semisulcatus DE HAAN, Crust. Fauna Japon. p. 191; DE MAN, Decapoda, Siboga Exped. pt. 1 55 (1911) 97.

Penæus carinatus DANA, U. S. Explor. Exped. Crust. (1852) 602, pl. 40, fig. 2.

LUZON, Manila markets, 0–148. The distribution is most likely throughout the Philippine waters, in shallow waters and down to twenty fathoms (possibly in still deeper waters). The Challenger specimen was secured off Panay in 20 fathoms on a mud bottom.

PENÆUS INDICUS (M. Edwards).

Penæus indicus MILNE EDWARDS, Hist. Nat. Crust. 2 : 415; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 248, pl. 33, fig. 2.

MINDORO, Batas, 0–209; off Panay (Challenger specimen) from depth of twenty fathoms on a mud bottom.

*"The group Aberrantia consists of several tribes and families that in their adult conditions approach more nearly to the characters common to other divisions, but which nevertheless during the progress of development pass through a stage common to the normal Phyllobranchiatic Macrura. The group has long been distinguished by carcinologists under the name of Anomura, sometimes as a division of the Macrura, and sometimes as a distinct order. It is as a separate group of the former that they are here noticed; for undoubtedly in their early stages they pass through a morphological change that is essentially macrurous."—SPENCE BATE.

PENÆUS INCISIPES Spence Bate.

Penæus incisipes SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 257, pl. 34, fig. 2.

Off Panay, depth, 20 fathoms, mud bottom.

PENÆUS FISSURUS Spence Bate.

Penæus fissurus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 263, pl. 36, fig. 1.

Near Tablas; off Cebu; 95–115 fathoms; green mud bottom.

PENÆUS GRACILIS Dana.

Penæus gracilis DANA, U. S. Explor. Exped. Crust. (1852) 606, pl. 4, fig. 5*a–b*; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 271.

Sulu Sea, 25 miles east of Panay (Dana).

PENÆUS PHILIPPINENSIS Spence Bate.

Penæus philippinensis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 261, pl. 35, figs. 2, 3.

Basilan Strait, 82 fathoms, stone and gravel bottom.

PENÆUS RECTACUTUS Spence Bate.

Penæus rectacutus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 266, pl. 36, fig. 2.

Metapenæus rectacutus ALCOCK and HENDERSON, Journ. Asiat. Soc. Bengal 63 (1894) 145.

Parapenæus rectacutus DE MAN, Decapoda, Siboga Exped. 55 (1911) 82; BALSS, Macrura, Deutsche Tiefsee Exped. 2 (1925) 228.

Between Bohol and Cebu, 95 fathoms, blue mud bottom (Challenger).

Genus HEMIPENÆUS Spence Bate

HEMIPENÆUS VIRILIS Spence Bate.

Hemipenæus virilis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 305, pl. 44, fig. 4.

Off Sibago, 250 fathoms, green mud bottom.

HEMIPENÆUS TOMENTOSUS Spence Bate.

Hemipenæus tomentosus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 307, pl. 40, figs. 2, 3; pl. 50.

Off Sibago, 250 fathoms, green mud bottom.

HEMIPENÆUS SPINODORSALIS Spence Bate.

Hemipenæus spinodorsalis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 301, pl. 44, fig. 1.

South of the Philippines, 2,050 fathoms, blue mud bottom.

HEMIPENÆUS GRACILIS Spence Bate.

Hemipenæus gracilis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 302, pl. 44, fig. 2.

Off Tablas, 700 fathoms, blue mud bottom.

Genus HALIPORUS Spence Bate

HALIPORUS EQUALIS Spence Bate.

Haliporus equalis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 285, pl. 41, fig. 1.

Between the Philippines and Borneo, 250 fathoms, green mud bottom.

HALIPORUS LÆVIS Spence Bate.

Haliporus lævis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 289, pl. 42, fig. 2.

Off Luzon, 1,050 fathoms, green mud bottom.

Genus BENTHESICYMUS Spence Bate

BENTHESICYMUS PLEOCANTHUS Spence Bate.

Benthesicymus pleocanthus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873-76) 334, pl. 57, fig. 2.

Off Luzon, 1,050 fathoms, blue mud bottom.

BENTHESICYMUS ALTUS Spence Bate.

Benthesicymus altus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 336, pl. 57.

South of the Philippines, 500 to 1,050 fathoms, blue mud bottom.

Genus ARISTEUS Duvernoy

ARISTEUS ARMATUS Spence Bate.

Aristeus armatus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873-76) 312, pls. 45, d6.

Aristeopsis Armatus BALSS, Macrura, Deutsche Tiefsee Exped. 2 (1925) 222.

South of the Philippines, 2,050 fathoms, blue mud bottom (Challenger).

Genus GENNADAS Spence Bate

GENNADAS PARVUS Spence Bate.

Gennadas parvus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 340, pl. 59.

Philippines, west of Manila, 2,100 fathoms, blue mud bottom.

SERGESTIDÆ

LUCIFERINÆ

Genus LUCIFER Vaughan Thompson

LUCIFER TYPUS Thompson.

Lucifer typus VAUGHAN THOMPSON, Zool. Researches (1829) 58, pl. 7, fig. 2; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 464, pl. 83; ROXAS, Rept. Puerto Galera Marine Biol. Lab. List of Anim. (1930).

Lucifer pacificus DANA, U. S. Explor. Exped. Crust. (1852) 673, pl. 45, fig. 2 (young).

Pelagic, abundant in plankton around Puerto Galera, Mindoro; Mindanao, off Zamboanga Province (Challenger).

LUCIFER REYNAUDII Milne Edwards.

Lucifer reynaudii MILNE EDWARDS, Hist. Nat. Crust. 2 : 469; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 466, pl. 84.

MINDANAO, off Zamboanga Province, on surface (Challenger).

SERGESTINÆ

Genus SERGESTES Milne Edwards

SERGESTES INTERMEDIUS Spence Bate.

Sergestes intermedius SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 383.

China Sea, off LUZON.

SERGESTES JAPONICUS Spence Bate.

Sergestes japonicus SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 387, pl. 70, figs. 1, 2.

Off Manila, 700 fathoms, blue mud bottom.

Genus ACANTHOSOMA Spence Bate

ACANTHOSOMA MACROTELSONIS Spence Bate.

Acanthosoma macrotelsonis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 374, pl. 66, fig. 1.

MINDANAO, Zamboanga Province, from plankton. Spence Bate believed this to be a young stage of one of the species of *Sergestes*.

Division TRICHOBRANCHIATA

Group NORMALIA

Tribe SYNAXIDEA

SCYLLARIDÆ

Genus IBACCUS Leach

IBACCUS CILIATUS (v. Siebold)

Scyllarus ciliatus v. Siebold, DE HAAN, Fauna Japon. (1850) 153, pl. 36; pl. 37, fig. 2.

LUZON, Manila Bay, 0–17.

IBACCUS VERDI Spence Bate.

Ibaccus verdi SPENCE BATE, Rept. Voy Challenger, Zool. 24 (1873–76) 58, pl. 7, fig. 2; pl. 8.

Off Zamboanga, 250 fathoms, green mud bottom.

Genus ARCTUS Dana

ARCTUS ORIENTALIS Spence Bate.

Arctus orientalis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 68, pl. 9, fig. 4; ALCOCK, Cat. Indian Deep-Sea Crust. Decapoda and Anomala, Indian Mus. Calcutta (1901) 181.

Between Bohol and Cebu; 95 fathoms, blue mud bottom (Challenger).

Genus SCYLLARUS Fabricius

SCYLLARUS SORDIDUS (Stimpson).

Arctus sordidus STIMPSON, Proc. Acad. Nat. Sci. Phila. Jan. (1860) 23.

Scyllarus sordidus G. NOBILI, Bollet. Mus. Torino, No. 455 18 (1903) 12; DE MAN, Decapoda, Siboga, Exped. pt. III 76 (1916) 65, pl. 2, figs. 11, 11a.

Philippines (Siboga).

SCYLLARUS GIBBEROSUS (de Man).

Arctus gibberosus DE MAN, Tijdschr. d. Ned. Dierk. Vereen (2) Dl. 9 (1905) 688.

Scyllarus gibberosus DE MAN, Siboga Exped. pt. III 76 (1916) 90, pl. 3, figs. 14–14d.

Off north Ubian, 6° 7′ 5″ north latitude, 120° 26′ east longitude (Siboga).

SCYLLARUS MARTENSII Pfeffer.

Scyllarus martensii BORRADAILLE, Fauna and Geog. Maldive and Laccadive Archipelago, pt. III 2 (1904) 754, pl. 58; fig. 4; RATHBUN, Brachyura and Macrura, Hawaiian Is., Wash. (1906) 896, pl. 18, fig. 2; DE MAN, Siboga Exped. pt. III 76 (1916) 84, pl. 3, figs. 13, 13a.

SULU, Sulu harbor, 14 m, sandy bottom (Siboga).

Genus THENUS Leach

THENUS ORIENTALIS Rumphius.

Thenus orientalis MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 286; HASWELL, Cat. Austral. Crust. (1882) 170; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 6 (1892) 46.

CEBU (Ortmann).

PALINURIDÆ

Genus PANULIRUS White

PANULIRUS PENICILLATUS (Olivier).

Palinurus penicillatus A. G. OLIVIER, Encycl. Method. 8 (1811) 674; H. M. EDWARDS, Hist. Nat. Crust. 2 (1837) 299.

Senex penicillatus ORTMANN, Zool. Jahrb. Abth. f. Syst. 6 (1891) 28.

Panulirus penicillatus RATHBUN, Brachyura and Macrura Hawaiian Is., Wash. (1906) 897.

MINDORO, Mindoro Province, Puerto Galera, 0–378; 0–376, 0–1640, places not indicated.

PANULIRUS ORNATUS (Fabricius).

Palinurus ornatus FABRICIUS, Suppl. Entom. Syst. (1798) 400.

Panulirus homarus G. NOBILI, Ann. Sci. Nat. (9), Zoöl. 4 (1906) 90.

MINDORO, Mindoro Province, Puerto Galera, 0–380; LUZON, Zambales Province, Olongapo, 0–278.

PANULIRUS VERSICOLOR (Latreille).

Palinurus versicolor LATREILLE, Ann. du Mus. 3 (1804) 394.
Palinurus fasciatus DE HAAN, Fauna Japon. Crust. (1850) 193, pl. 43, fig. 2.
Panulirus versicolor G. NOBILI, Bul. Sci. France-Belgique 40 (1906) 59; DE MAN, Decapoda, Siboga, Exped. pt. III 76 (1916) 55, pl. 2, figs. 7–7c.

MINDORO, Mindoro Province, Puerto Galera, 0–722, 0–20.

Tribe ASTACIDEA

ERYONIDÆ

Genus PENTACHELES Spence Bate

PENTACHELES LÆVIS Spence Bate.

Pentacheles lævis SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 144, pl. 15, fig. 5; SPENCE BATE, Ann. Mag. Nat. Hist. (5) 2 (1878) 278.

South of the Philippines, 500 fathoms, blue mud bottom (Challenger).

HOMARIDÆ

Genus NEPHROPS Leach

NEPHROPS THOMSONI Spence Bate.

Nephrops thomsoni SPENCE BATE, Rept. Voy. Challenger, Zoöl. 24 (1873–76) 185, pls. 25, 26.

Off TABLAS, 100 fathoms, green mud bottom.

Tribe STENOPIDEA

Family STENOPIDÆ Spence Bate

Genus STENOPUS Latreille

STENOPUS HISPIDUS Adams and White.

Stenopus hispidus DANA, U. S. Explor. Exped. Crust. (1852) 607, pl. 40, fig. 8; SPENCE BATE, Voy. Challenger, Zoöl. 24 (1873–76) 211, pl. 30; BALSS, Macrura, Deutsche Tiefsee Exped. 2 (1925) 239.

MINDORO, Mindoro Province, Calapan and Puerto Galera, 0–1841.

Genus SPONGICOLA de Haan

SPONGICOLA VENUSTA de Haan.

Spongicola venusta DE HAAN, Fauna Japon. Crust. (1850) 194, pl. 46, fig. 9; MIERS, Journ. Linn. Soc. London 13 : 507, pl. 24, figs. 1, 2; SPENCE BATE, Rept. Voy. Challenger, Zool. 24 (1873–76) 213, pl. 29.

Off Cebu, 95 fathoms, blue mud bottom (Challenger).

Group ABERRANTIA

Family GALATHEIDÆ Dana

Genus GALATHEA Fabricius

GALATHEA ELEGANS White.

Galathea elegans WHITE, List Crust. Brit. Mus. (1847) 66; MIERS, Crust. Zoöl. H. M. S. Albert (1884) 278.

MINDORO, Mindoro Province, Puerto Galera, 0–1828. This beautifully colored species is found almost invariably in pairs.

GALATHEA SUBSQUAMATA Stimpson.

Galathea subsquamata STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 90.

Off Tablas, 100 to 115 fathoms, green mud bottom (Challenger).

GALATHEA GRANDIROSTRIS Stimpson.

Galathea grandirostris STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 90.

Off CEBU, 95 to 100 fathoms, blue mud bottom (Challenger).

GALATHEA ACULEATA Haswell.

Galathea aculeata HASWELL, Proc. Linn. Soc. N. S. W. 6 (1882) 761.

Off Manila, 18 fathoms, blue mud bottom (Challenger).

Genus MUNIDA Leach

MUNIDA INCERTA Henderson.

Munida incerta HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 180, pl. 13, fig. 4; BENEDICT, Proc. U. S. N. M. No. 1311 26 : 307.

Off Siboga, 250 fathoms, green mud bottom (Challenger).

MUNIDA MILITARIS var. CURVIROSTRIS Henderson.

Munida curvirostris HENDERSON, Ann. & Mag. Nat. Sci. (5) 16 (1885) 412; BENEDICT, Proc. U. S. N. M. No. 1311 16: 307.

Munida militaris var. *curvirostris* HENDERSON, Rept. Voy. Challenger, Zool. 27 (1888) 139, pl. 3, fig. 7.

SIBOGA, 250 fathoms; green mud bottom (Challenger). Cebu (Benedict), 375 fathoms; blue mud bottom.

Genus MUNIDOPSIS Whiteaves

MUNIDOPSIS MILLERI Henderson.

Munidopsis milleri HENDERSON, Ann. & Mag. Nat. Hist. (5) 16 (1885) 414.

Off Tablas Island, 700 fathoms, blue mud bottom (Challenger).

MUNIDOPSIS PILOSA Henderson.

Munidopsis pilosa HENDERSON, Ann. & Mag. Nat. Hist. (5) 16 (1885) 415.

Near the Philippines, 825 fathoms; hard ground bottom (Challenger).

Genus ELASMONOTUS A. M. Edwards

ELASMONOTUS DEBILIS Henderson.

Galathopsis debilis HENDERSON, Ann. & Mag. Nat. Hist. (5) 16 (1885) 415.

Elasmonotus debilis HENDERSON, Rept. Voy. Challenger, Zool. 27 (1888).

PHILIPPINES, 375 fathoms; blue mud bottom.

Genus UROPTYCHUS Henderson

UROPTYCHUS SPINIMARGINATUS Henderson.

Diptychus spinimarginatus HENDERSON, Ann. Mag. Nat. Hist. (5) 16 (1885) 419.

Uroptychus spinimarginatus HENDERSON, Rept. Voy. Challenger, Zool. 27 (1888) 176, pl. 21, fig. 2; BENEDICT, Proc. U. S. N. M. 26 : 333.

South of the Philippines, 500 fathoms, blue mud bottom (Challenger).

THALASSINIDÆ

Genus THALASSINA Latreille

THALASSINA ANOMALA (Herbst).

Cancer anomalous HERBST, Krabben u. Krebse III (1803) 45, pl. 62.

Thalassina scorpionides LATREILLE, Gen. Crust. et Ins. 1 (1807) 51.

Thalassina anomala DE MAN, Journ. Linn. Soc. London 22 (1888) 260.

MINDORO, Mindoro Province, Puerto Galera 0–8. LUZON, Manila, Malate, 0–29, 0225; Zambales, Subic, 0224. PALAWAN, Busuanga, 0279. MACTAN, Cebu, 0220. BASILAN, Zamboanga, 0221. TAWITAWI, 0223.

CALLIANISSIDÆ

Genus CALLIANASSA Leach

CALLIANASSA MUCRONATA Strahl.

Callianassa mucronata STRAHL, Mon. Ber. Akad. Wiss. Berlin (1861) 1056; A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 6 (1870) 94; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 6 (1892) 57.

Philippines (Strahl).

Genus GEBIA Leach

GEBIA BARBATA Strahl.

Gebia barbata STRAHL, Mon. Akad. Wiss. Berlin (1861) 1062; ORTMANN, Decapod. Krebse, Strassburger Mus. Zool. Jahrb. Syst. 6 (1892) 54, pl. 1, fig. 8.

LUZON (Strahl).

AXIIDÆ

Genus AXIUS Leach

Subgenus NEAXIUS Borradaile

AXIUS (NEAXIUS) PLECTRORHYNCHUS Strahl.

Axius (*Neaxius*) *plectrorhynchus* DE MAN, Decapoda, Siboga Exped. 101–104 (1925) 4.

LUZON, between tide marks, 3 to 4 fathoms below tide marks.

AXIUS (EICONAXIUS) SIBOGUE de Man.

Axius (*Eiconaxius*) *sibogue* DE MAN, Decapod. Siboga, Exped. pt. VI 101–104 (1925) 34, figs. 4-4*h*.

Sulu Sea, 285 fathoms, stony bottom.

Genus AXIOPSIS Borradaile

AXIOPSIS (AXIOPSIS) CONSOBRINA de Man.

Axiopsis (*Axiopsis*) *consobrina* DE MAN, Decapoda, Siboga Exped. pt. 6 101–104 (1925) 80.

Sulu Sea, 150 fathoms, coral bottom.

Genus SCYTOLEPTUS Gerstaecker

SCYTOLEPTUS SERRIPES Gerstaecker.

Scytoleptus serripes A. GERSTAECKER, Archiv. f. Naturg. 22 (1856) 158, pl. 6, figs. 1–4; HILGENDORF, Monatsber. Kön. Akad. Wiss. Berl. Now. (1878) 827; DE MAN, Decapod. Siboga Exped. pt. VI 101–104 (1925) 49.

Luzon (Siboga).

Suborder ANOMURA[a]

Tribe PAGURIDEA

Section PAGURODEA Henderson

Branch LAMINIBRANCHIATA

Family PAGURIDÆ Dana

Genus CLIBANARIUS Dana

CLIBANARIUS CORALLINUS (Milne Edwards).

Pagurus corallinus MILNE EDWARDS, Ann. Sci. Nat. Zool. (3) 10 (1848) 63.

Clibanarius corallinus ALCOCK, Cat. Ind. Decapod. Crust. II, Fasc. 1 (1905) 48, pl. 5, fig. 1.

LUZON, Manila Bay, 0–343. MEDIO, Mindoro Province, Puerto Galera, 0–461.

[a] The anomurans occupy an indefinite position between the Macrura and Brachyura. In some systematic works they have been divided into two subdivisions—Macrura Anomalia and Brachyura Anomalia.

The system adopted in this work is that of Henderson (Challenger Rept. Zool. 27). Some of the specimens included in the list are labeled but not numbered.

CLIBANARIUS ANTILLENSIS Stimpson.

Clibanarius antillensis STIMPSON, Ann. Lyc. Nat. Hist. 7 (1859) 85; BENEDICT, Bul. U. S. Fish Comm. 20 (1900) 142, pl. 6, fig. 1.

MINDORO, Mindoro Province, Puerto Galera. PALAWAN, Taytay.

CLIBANARIUS CRUENTATUS (Milne Edwards).

Paguristes cruentatus MILNE EDWARDS, Ann. Sci. Nat. Zool. (3) 10 (1848) 62.

PALAWAN, Taytay, 0–1214; MINDORO, Mindoro Province, Puerto Galera, 0–1921.

CLIBANARIUS ERYSTERNUS Hilgendorf.

Clibanarius erysternus DE MAN, Archiv. f. Naturg. 53 (1887) 447.

LUZON, Manila Bay, 0–345. MINDORO, Mindoro Province, Puerto Galera, 0–457.

CLIBANARIUS CLIBANARIUS (Herbst).

Cancer clibanarius HERBST, Krabben u. Krebse 2 (1791) 20, pl. 28, fig. 1.

Clibanarius clibanarius HILGENDORF, M. B. K. Akad. Berlin (1878) 820.

PALAWAN, Taytay, 0–1241; 0–1738, not indicated.

CLIBANARIUS INFRASPINATUS Hilgendorf.

Clibanarius infraspinatus HILGENDORF, in V. d. Decken's Reisen Ost-Afric III 1 (1869) 97.

LUZON, Bataan; Mariveles, 0–276. PALAWAN, Taytay. MINDORO, Mindoro Province, Puerto Galera.

CLIBANARIUS STRIOLATUS Dana.

Clibanarius striolatus DANA, U. S. Explor. Exped. Crust. 1 (1852) 463, pl. 24, figs. 3*a–c*.

PALAWAN, Taytay, 0–1318.

CLIBANARIUS SCLOPETARIUS Herbst.

Clibanarius sclopetarius HERBST, Krabben u. Krebse 2 (1796) 23, pl. 28, fig. 3; BENEDICT, Bul. U. S. Fish Comm. 20 (1900) 142.

MINDORO, Mindoro Province, Puerto Galera, 0–459. PALAWAN, Taytay, 0–1900.

CLIBANARIUS PADAVENSIS de Man.

Clibanarius padavensis ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 44, pl. 4, fig. 2.

MINDORO, Mindoro Province, Puerto Galera, 0–1813; LUZON, Manila Bay.

CLIBANARIUS PHILIPPINENSIS Ypchiongco sp. nov.

Small, scarcely setose except towards the extremities of chelipeds and legs; antennal angles of carapace yellowish white; fingers of chelipeds white; propodite of legs with dark-violet rings around distal ends; dactyli white; dactylus of third left leg shorter than its propodus. Carapace elongated, its greatest breadth about five eighths of its length; gastric region deeply punctate and hardly setose; branchial region with a trans-

verse series of hair tufts immediately behind cervical groove; rostral projection small and triangular; antennal angles of carapace yellowish white, less intensely so at rostrum. Ocular stalk moderately slender, slightly shorter than front border of carapace but slightly longer than antennular peduncle; eyes, with white ring around base, occupying about one seventh or more of length of stalk; ophthalmic scales broad, truncate, with two spinules on the inner anterior margin. Antennal acicle long and slender, spinose on the dorsal side, especially about tip; apices calcareous white and parallel to base of last joint of peduncle; second segment of peduncle with one projecting spine on outer upper distal margin and another on inner inferior border about some distance behind distal end. Chelipeds similar in form but subequal, the right slightly the larger; lower inner margin of merus serrate; general surface with yellowish or white, squamiform tubercles scattered here and there; distal outer edge of merus armed with two spinules; carpus with a strong spine and few elevated tubercles on distal upper inner border; hand flat dorsally, swollen at base and globular below; dorsal surface of hand studded with high conical tubercles; fingers yellowish-white and armed with spinose tubercles towards apices; finger tips corneous and blackish brown. Crawling legs longer than chelipeds; merus of third pair of legs with dark violet spots on both upper and lower borders which tend to meet medially; carpus of legs with a single spine on upper distal end; propodus of legs provided with a dark violet ring around the distal end; penultimate segment of third left leg convex, with a slight ridge converging medially; upper edge cristiform; dactylus shorter than propodite; dactyli of legs whitish yellow with black corneous apices; ischiopodites studded with low elevated granules. Chelipeds and legs become more setose gradually towards their extremities.

LUZON, Manila Bay, 0–190†. PALAWAN, Taytay.

Genus PAGURUS Fabricius

PAGURUS BIFORMIS Milne Edwards.

Pagurus biformis MILNE EDWARDS, Ann. Sci. Nat. Zool. (2) 6 : 229.
Pagurus cultrerus WHITE, List Crust. Brit. Mus. (1848) 60.

MINDORO, Mindoro Province, Puerto Galera, Calapan. PALAWAN, Taytay.

PAGURUS DERMATUS Henderson.

Pagurus dermatus HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 58.

MINDORO, Mindoro Province, Puerto Galera.

PAGURUS ASPER de Haan.

Pagurus asper DE HAAN, Faun. Japon. (1849) 208, pl. 49, fig. 4.
Dardanus haani RATHBUN, Proc. U. S. N. M. (1903) 34.

Shores of MINDORO.

PAGURUS VULNERANS Thallwitz.

Pagurus vulnerans THALLWITZ, Abh. u. Ber. k. Zoöl. Mus. No. 3 (1890) 33.

MINDORO, Mindoro Province, Puerto Galera, 0-450. PALAWAN, Balabac Strait, 0-1419.

PAGURUS PUNCTULATUS Olivier.

Cancer magistes HERBST, Krabben u. Krebse 3 (1804) 23, pl. 11, fig. 1.
Pagurus punctulatus OLIVIER, Encycl. Method. 8 (1811) 639.

MINDORO, Mindoro Province, Puerto Galera and Calapan. PALAWAN, Taytay.

PAGURUS WOOD-MASONI Alcock.

Pagurus wood-masoni ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 85, pl. 9, fig. 3.

MINDORO, Mindoro Province, Puerto Galera.

PAGURUS FABIMANUS Dana.

Pagurus fabimanus DANA, U. S. Explor. Exped. Crust. 1 (1852) 454, pl. 28, figs. 7*a–c*.

MINDORO, Mindoro Province, Puerto Galera, 0-721.

PAGURUS EUOPSIS Dana.

Pagurus euopsis DANA, U. S. Explor. Exped. Crust. 1 (1852) 452, pl. 27, figs. 6*a–c*.
Pagurus depressus HELLER, S. B. K. Akad. Wien 44 (1861) 248.

MINDORO Coast, 0-1536.

PAGURUS GUTTATUS Olivier.

Pagurus guttatus OLIVIER, Encycl. Method. 8 (1811) 640.
Pagurus setifer HESS, Archiv. f. Nat. 31 (1865) 161.

MINDORO, Mindoro Province, Puerto Galera, 0-1920.

PAGURUS SEMILIMANUS Henderson.

Pagurus semilimanus HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 59, pl. 6, fig. 6.

MINDANAO, off Zamboanga Province, 375 fathoms, blue mud bottom.

PAGURUS STRIATUS Latreille.

Cancer arrosor HERBST, Naturg. Krabben u. Krebse 2 (1796) 170, pl. 43, fig. 1.
Pagurus striatus LATREILLE, Hist. Nat. Crust. et Insect. 7 (1802) 162.

Off CEBU, on a reef. TABLAS, 100 to 115 fathoms, green mud bottom (Challenger).

Genus ANICULUS Dana

ANICULUS ANICULUS (Herbst).

Cancer aniculus HERBST, Krabben u. Krebse 2 (1791) 37.
Pagurus aniculus FABRICIUS, Ent. Syst. 2 (1793).
Aniculus aniculus ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 94, pl. 7, fig. 6.

MINDORO, Mindoro Province, Puerto Galera, 0–60, 0–170, 0–377.

Genus DIOGENES Dana

DIOGENES AVARUS Heller.

Diogenes avarus HELLER, Novara Crust. (1866) 83, pl. 7, fig. 2.

MINDORO, Mindoro Province, Puerto Galera, 0–1924.

DIOGENES BREVIROSTRIS Stimpson.

Diogenes brevirostris STIMPSON, Smithsonian Mus. Coll. 49 (1907) 201, pl. 19, fig. 2.

PALAWAN, Taytay.

DIOGENES LANARIS Yapchiongco.

Diogenes lanaris YAPCHIONGCO (in MS, 1933).

Carapace elongate with greatest breadth across branchial region about five-sixths of sagittal length; gastric region smooth at center but roughened towards sides by anteriorly tilted and elevated scalelike plates whose edges are cut into minute spinules; edges also fringed with beautiful, metallic, silky yellowish bristles. Anterolateral borders of carapace finely spinulate; rostriform process merely a slender strongly acuminate spinule, slightly surpassing ophthalmic scales.

Eyestalk slender, longer than front border of carapace by a third or less of its length and shorter than antennular peduncle by a corneal length; cornea not dilated; ophthalmic scale arcuate with four or five dentines on anterior border. Antennal peduncle moderately long, reaching halfway to last segment of antennular; antennal acicle vertically laminate, acuminate, and provided with four calcareous spines on superior edge, reaching beyond base of last segment of peduncle.

Chelipeds plumose, the left much longer; denuded outer surface covered with irregular platelike granules. External surface of merus covered with similar granules gradually becoming elevated, blunt tubercles towards the inferior edge; lower outer margin serrate; its superior border sharp and crenulate, the last two tubercles becoming clawlike spines distally. Outer surface of carpus tuberculose and alternated with calcareous spines arranged in rows of twos and threes; outer distal margin beset with spinules, the spinules tending to become spines towards superior border; dorsal edge produced into a vertical crest a short distance from proximal end towards middle. Crest mounted with six strong calcareous spines at distal half, gradually merging into general surface anteriorly. Palm with a short longitudinal median carina or ridge on proximal half of extensor area which merges into general surface distally; ridge beset with five to seven white spines; halfway between this ridge and the superior border on same surface a dorsally concave, linear series of calcareous spinules reaching base of mobile finger. Other spinules on general sur-

face, especially on distal portion, each one occupying an intersection of borders of platelike granules. Hand about twice as long as wide; superior border raised into a dikelike elevation armed with spinose tubercles flanking one or two series of larger spines. Inferior margin likewise beset with one or two series of thornlike spinules. Fingers roughened by conical spines; superior border of dactylus spinulated, a continuation from same border of hand; fixed finger somewhat deflexed; finger apices acuminate. Right cheliped smooth and absolutely unarmed though greatly plumose. Left crawling legs slightly exceeding apex of big cheliped; like chelipeds, legs plumose with wooly hairs mostly confined on upper and lower borders.

PALAWAN, Taytay, 0–1797. Type specimen is in the Collection of the Zoology Department, University of the Philippines.

Genus CALCINUS Dana

CALCINUS HERBSTII de Man.

Pagurus tilieen MILNE EDWARDS, Ann. Sci. Zoöl. (2) 5 (1836) 278.
Pagurus lævimanus RANDALL, Journ. Acad. Philad. 7 (1839) 135.
Calcinus herbstii ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 53, pl. 5, fig. 4.

LUZON, Rizal Province, Pasay, 0–345. MINDORO, Mindoro Province, Puerto Galera, 0–327.

CALCINUS ELEGANS (Milne Edwards).

Pagurus elegans MILNE EDWARDS, Hist. Nat. Crust. (1837) 229.
Calcinus elegans DANA, U. S. Explor. Exped. Crust. 1 (1852) 458, pl. 27, fig. 10.

MINDORO, Mindoro Province, Puerto Galera, 0–338.

CALCINUS TERRÆ-REGINÆ Haswell.

Calcinus terræ-reginæ HASWELL, Proc. Linn. Soc. N. S. Wales 6 (1881) 700.

MINDORO, Mindoro Province, Puerto Galera, 0–1906.

CALCINUS LATENS (Randall).

Pagurus latens RANDALL, Journ. Acad. Philad. (1839) 135.
Calcinus intermedius DE MAN, Notes Leyden Mus. 3 (1881) 102.
Calcinus latens ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 58, pl. 5, fig. 5.

MINDORO, Mindoro Province, Puerto Galera, 0–1923.

Genus EUPAGURUS Brandt

EUPAGURUS JANITOR Alcock.

Eupagurus janitor ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 132, pl. 11, fig. 6.

ILOCO, Calapan. MINDORO, Mindoro Province, Puerto Galera, 0–1517, 0–1922, 01521.

EUPAGURUS SPINOLENTUS Henderson.

Eupagurus spinolentus HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 68, pl. 7, fig. 3.

Off TARLAC, 100 to 115 fathoms, green mud bottom.

face, especially on distal portion, each one occupying an intersection of borders of platelike granules. Hand about twice as long as wide; superior border raised into a dikelike elevation armed with spinose tubercles flanking one or two series of larger spines. Inferior margin likewise beset with one or two series of thornlike spinules. Fingers roughened by conical spines; superior border of dactylus spinulated, a continuation from same border of hand; fixed finger somewhat deflexed; finger apices acuminate. Right cheliped smooth and absolutely unarmed though greatly plumose. Left crawling legs slightly exceeding apex of big cheliped; like chelipeds, legs plumose with wooly hairs mostly confined on upper and lower borders.

PALAWAN, Taytay, 0–1797. Type specimen is in the Collection of the Zoölogy Department, University of the Philippines.

Genus CALCINUS Dana

CALCINUS HERBSTII de Man.

Pagurus tibicen MILNE EDWARDS, Ann. Sci. Zoöl. (2) 5 (1836) 278.
Pagurus lævimanus RANDALL, Journ. Acad. Philad. 7 (1839) 135.
Calcinus herbstii ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 53, pl. 5, fig. 4.

LUZON, Rizal Province, Pasay, 0–345. MINDORO, Mindoro Province, Puerto Galera, 0–327.

CALCINUS ELEGANS (Milne Edwards).

Pagurus elegans MILNE EDWARDS, Hist. Nat. Crust. (1837) 229.
Calcinus elegans DANA, U. S. Explor. Exped. Crust. 1 (1852) 458, pl. 27, fig. 10.

MINDORO, Mindoro Province, Puerto Galera, 0–333.

CALCINUS TERRÆ-REGINÆ Haswell.

Calcinus terræ-reginæ HASWELL, Proc. Linn. Soc. N. S. Wales 6 (1881) 760.

MINDORO, Mindoro Province, Puerto Galera, 0–1906.

CALCINUS LATENS (Randall).

Pagurus latens RANDALL, Journ. Acad. Philad. (1839) 135.
Calcinus intermedius DE MAN, Notes Leyden Mus. 3 (1881) 102.
Calcinus latens ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 58, pl. 5, fig. 5.

MINDORO, Mindoro Province, Puerto Galera, 0–1923.

Genus EUPAGURUS Brandt

EUPAGURUS JANITOR Alcock.

Eupagurus janitor ALCOCK, Cat. Ind. Decapod. Crust. Fasc. I 2 (1905) 132, pl. 11, fig. 6.

BACO, Calapan. MINDORO, Mindoro Province, Puerto Galera, 0–1517, 0–1922, 01521.

EUPAGURUS SPINOLENTUS Henderson.

Eupagurus spinolentus HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 68, pl. 7, fig. 3.

Off TABLAS, 100 to 115 fathoms, green mud bottom.

Genus PAGURISTES Dana

PAGURISTES HIANS Henderson.

Paguristes hians HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 79, pl. 8, fig. 4.

Off Manila, 18 fathoms, blue mud bottom.

Genus SPIROPAGURUS Stimpson

SPIROPAGURUS SPIRIGER (de Haan).

Pagurus spiriger DE HAAN, Faun. Japon. Crust. (1850) 206 pl. 49, fig. 2.

Spiropagurus spiriger STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 86; HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 72.

Off Manila, 18 fathoms, blue mud bottom (Challenger).

Family CŒNOBITIDÆ Dana

Genus BIRGUS Leach

BIRGUS LATRO (Linn.)

Cancer crementatus RUMPHIUS, D' Amboinisch Rariteitkamer (1705) 7, pl. 4.

Pagurus latro FABRICIUS, Soppl. Ent. Syst. (1798) 411.

Birgus latro LEACH, Trans. Linn. Soc. London 11 (1815) 337.

Of very wide distribution in the Philippines; specimens had been collected from CABRO, Mindanao; CAMOTES, Cebu Province; SAMAR; LUZON, Cagayan Province, Claveria; PALAWAN; The Batanes Group, and other places.

Genus CŒNOBITA Latreille

CŒNOBITA RUGOSA Milne Edwards.

Cœnobita rugosa MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 241; DANA, U. S. Explor. Exped. Crust. (1852) 471, pl. 30, figs. 1, 2.

Cœnobita compressa var. *rugosa* BOUVIER, Bul. Sci. Philom. (8) 3 (1890) 21.

MINDANAO, Lanao Province, Kolambugan, 0–928. PALAWAN, Taytay, 0–1225; Sulu Sea (Dana).

CŒNOBITA PERLATA Milne Edwards.

Cœnobita perlata MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 242.

Cœnobita purpurea STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 245.

MINDORO, Mindoro Province, Puerto Galera, 0–1903.

CŒNOBITA CAVIPES Stimpson.

Cœnobita cavipes STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 254.

Cœnobita violascens HELLER, Verh. Zool. Bot. Ges. Wien 12 (1862) 524.

Cœnobita compressa MIERS, Ann. Mag. Nat. Hist. (5) 5 (1880) 371.

PALAWAN, Taytay, 0–1222. SAMAR, Batag, 0–964.

COENOBITA CLYPEATA (Herbst).

Cancer clypeata HERBST, Krabben u. Krebse 2 (1796) 22, pl. 23, fig. 2.
Cœnobita clypeata LATREILLE, Fam. Nat. du. Anim. (1828) 277.

From the shores of MINDANAO, 0–31, 0–442, 0–1880.

Branch FIBRIBRANCHIATA Henderson

Family PARAPAGURIDÆ S. I. Smith

Genus PAGURODES Henderson

PAGURODES PILIFEROUS Henderson.

Pagurodes piliferous HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 96, pl. 9, fig. 5.

Off Tablas, 100 to 115 fathoms, green mud bottom.

PAGURODES LIMATULUS Henderson.

Pagurodes limatulus HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 97, pl. 10, fig. 6.

South of the Philippines, 500 fathoms, blue mud bottom.

Genus PAGUROPSIS Henderson

PAGUROPSIS TYPICUS Henderson.

Paguropsis typicus HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 99, pl. 10, fig. 4.

Off Tablas, 100 to 115 fathoms, green mud bottom.

Genus PARAPAGURUS Henderson

PARAPAGURUS ABYSSORUM A. M. Edwards in MS.

Parapagurus abyssorum HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 86.

Off the Philippines, 1,075 fathoms, blue mud bottom.

Tribe PORCELLANIDEA

Section PORCELLANODEA Henderson

Family PORCELLANIDÆ Dana

Genus PETROLISTHES Stimpson

PETROLISTHES RATHBUNÆ Schmitt.

Petrolisthes rathbunæ SCHMITT, Decapod. Crust. Cal. Univ. Pub. Zoöl. 23 (1921) 181, pl. 32, fig. 3.

LUZON, Tayabas Province, Atimonan, 0–1772; Bataan Province, Mariveles 0–1751.

PETROLISTHES GRACILIS Stimpson.

Petrolisthes gracilis STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1862) 74; SCHMITT, Decapod. Crust. Cal. Univ. Pub. Zoöl. 23 (1921) 181, pl. 32, fig. 4.

LUZON, Tayabas Province, Atimonan, 0–1771.

PETROLISTHES ERIOMERUS Stimpson.

Petrolisthes eriomerus STIMPSON, Ann. Lyc. Nat. Hist. New York 10 (1871) 119; SCHMITT, Decapod. Crust. Cal. Univ. Pub. Zoöl. 23 (1921) 180, pl. 32, fig. 2.

Mindoro, Mindoro Province, Puerto Galera.

PETROLISTHES MARGINATUS Stimpson.

Petrolisthes marginatus STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1859) 74; BENEDICT, Anomuran Coll. Fish Hawk Exped. Porto Rico (1901) 134, pl. 3, fig. 1.

MINDORO, Mindoro Province, Puerto Galera, 0–1802.

Genus PISISOMA Stimpson

PISISOMA SCULPTUM (Milne Edwards).

Porcellana sculpta MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 253; DANA, U. S. Explor. Exped. (1852) 412, pl. 26, fig. 2.

Porcellana pulchella Haswell, Cat. Austral. Crust. (1882) 148.

Pachycheles pulchellus MIERS, Rept. Zoöl. Coll. "Alert" (1848) 273, pl. 30, fig. A.

Pisisoma sculptum ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 6 (1892) 265.

Sulu Sea (Dana).

Henderson[10] grouped the families Galatheidæ and Porcellanidæ to constitute the Tribe Galatheidea of Anomura. Spence Bate[11] placed Galatheidæ in the Division Trichobranchiata, Group Aberrantia of Macrura. This family is retained in this position in this paper.

Galathea is much more macrurous in general appearance, while *Petrolisthes* resembles the brachyurans, its flattened, broad and almost quadrangular cephalothorax making it appear very much like the true crabs. Its anomuran characteristics are only the long antennæ, the presence of uropods, and the fact that the pleura of the abdominal segments are separate, not fused.

The writer proposes that the Section Porcellanodea be raised to the tribe Porcellanidea, pending the study of the comparative anatomy of the nervous system and the degree of cephalization in these groups.

Tribe HIPPIDEA

Family HIPPIDÆ Dana

Genus REMIPES Stimpson

REMIPES TESTUDINARIUS Latreille.

? *Hippa adactyla* FABRICIUS, Ent. Syst. 2 (1793) 474; LATREILLE, Hist. Nat. Crust. 6 (1803) 176.

Cancer emeritus HERBST, Naturg. Krabben u. Krebse 2 (1796) 8, pl. 22, fig. 4.

[10] Chall. Rept. Zool. 27 (1888). [11] Chall. Rept. Zool. 24 (1888).

Remipes testudinarius LATREILLE, Gen. Crust. et Ins. 1 (1806) 45; LAMARCK, Hist. Anim. sans Vert. 5 (1818) 223; DESMAREST, Consid. Crust. (1825) 176, pl. 29, fig. 1; HELLER, Reise der Novara, Crust. (1865) 72; MIERS, Journ. Linn. Soc. Zoöl. 14 (1879) 312.

Remipes marmoratus WHITE, List, Crust. Brit. Mus. (1847) 58 sine descr.

Remipes pacificus DANA, U. S. Explor. Exped. 13 (1852) 407, pl. 25, fig. 7; STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1862) 241.

Very widely distributed in the Philippines. Specimens were collected from GUIMARAS, Iloilo; CEBU; MINDORO, Mindoro Province, Puerto Galera; LUZON, Bauan, Batangas; La Union Province, Ilocos Sur Province, Ilocos Norte Province, and other places. Quite common along the water line where the sand is coarse and loose.

REMIPES TESTUDINARIUS var. DENTICULATIFRONS (White).

Remipes testudinarius var. *denticulatifrons* MIERS, Journ. Linn. Soc. Zoöl. 14 (1879) 318.

CEBU, 0–1182. The variety is quite rare.

Genus MASTIGOCHIRUS Stimpson

MASTIGOCHIRUS QUADRILOBATUS Miers.

Mastigochirus quadrilobatus MIERS, Journ. Linn. Soc. Zoöl. 14 (1879) 322, pl. 5, fig. 8.

GUIMARAS (Miers).

Family ALBUNEIDÆ Stimpson

Genus ALBUNEA Fabricius

ALBUNEA SYMNISTA (Linnæus).

Cancer symnista LINNÆUS, Syst. Nat. (1766) 1053.

Hippa symnista FABRICIUS, Ent. Syst. 2 (1793) 474.

Albunea symnista MIERS, Journ. Linn. Soc. Zoöl. 14 (1879) 326.

LUZON, La Union Province, 0–1852; Ilocos Sur Province; Cagayan Province, Aparri.

This species differs from the allied species *R. testudinarius* in preferring as habitat the more compact and finer sand.

ALBUNEA MICROPS White.

Albunea microps WHITE, List Crust. Brit. Mus. Append. (1847) 129.

Sulu Sea, 10 fathoms (Miers).

BRACHYURA PRIMIGENIA OR DROMIACEA [12]

[12] Boas is of the opinion that the Dromiacea are Brachyura, and Bouvier, that they connect the higher Brachyura with the homarid family of Macrura. The opinion adopted here is that of Alcock, who adopted the view of Boas and subdivided it into natural groups: Homolidea and Dromidea with corresponding families:

Homolidea—
1. Homolidæ
2. Latreillidæ

Dromidea—
1. Homolodromidæ
2. Dynomidæ
3. Dromidæ

Tribe HOMOLIDEA

LATREILLIDÆ

Genus LATREILLOPSIS Henderson

LATREILLOPSIS BISPINOSA Henderson.

Latreillopsis bispinosa HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 22, pl. 2, fig. 3; ALCOCK, Carc. Faun. India. Journ. Asiat. Soc. Bengal 68 (1899) 166.

CEBU (Challenger), 95 fathoms, blue mud bottom.

Genus LATREILLA Roux

LATREILLA VALIDA de Haan.

Latreilla valida DE HAAN, Faun. Japon. Crust. (1839) 407, pl. 30, fig. 1; HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 24; RATHBUN, Proc. U. S. N. M. 26 : 32.

CEBU, 95 fathoms, blue mud bottom (Challenger).

Tribe DROMIDEA

DROMIDÆ

Genus DROMIA Fabricius

DROMIA (CRYPTODROMIA) TUBERCULATA Stimpson.

Dromia (*Cryptodromia*) *tuberculata* ALCOCK, Carc. Faun. India. Journ. Asiat. Soc. Bengal 68 (1899) 141.

MINDORO, Mindoro Province, Puerto Galera, 0–270. PARELLONES, 0–1098. LUZON, Batan Province, Mariveles, 0367.

Genus CRYPTODROMIA Stimpson

CRYPTODROMIA LATERALIS (Gray).

Dromia verrucosipes WHITE, List Crust. Brit. Mus. (1847) 55.

Cryptodromia lateralis HENDERSON, Rept. Voy. Challenger, Zoöl. 27 (1888) 5.

Philippines (Challenger).

Tribe OXYSTOMATA

Family RANINIDÆ Dana

Genus RANINA Lamarck

RANINA DENTATA Latreille.

Ranina dentata VON SIEBOLD, Faun. Japon. Crust. (1839) 139, pl. 35, fig. 1.

MINDANAO, Zamboanga Province. PINGET, Puro. LUZON, Ilocos Sur Province, Lapog Bay. These crabs inhabit the sandy bottom where they lie buried, like many of the Leucosiidæ and Calappidæ. In Zamboanga, where these crabs are caught in considerable numbers, they are considered a delicacy, and are commonly sold in the markets.

Carcinologists differ as to the systematic position of this group. Lamarck[13] arranged *Ranina* with Hippidæ in a distinct section of the family characterized by the lamellated terminal joints of the legs. Henderson[14] recognized the tribe Raninidea of Dana and placed it under Anomura, while Boas placed it with the Brachyura. Miers[15] wrote: "I believe their (Hippidæ) true affinities are with the Oxystomatous Brachyura through the Raninidæ." Alcock considered the Raninidæ as lowest among the oxystomatous crabs.

Suborder BRACHYURA

Tribe OXYSTOMATA or LEUCOSIIDEA

LEUCOSIDÆ

Subfamily LEUCOSINÆ Miers

Genus LEUCOSIA Fabricius

LEUCOSIA HASWELLI Miers.

Leucosia haswelli MIERS, Rept. Voy. Challenger Brachyura 17 (1886) 324, pl. 27, fig. 2; NOBILI, Ann. Mus. Civ. St. Nat. Genova (2) 20 (1899) 251; CALMAN, Trans. Linn. Soc. (2) 8 (1900) 27; IHLE, Siboga Exped. 85 (1918) 276.

PALAWAN, Taytay, 0–1207. MINDORO, Mindoro Province, Puerto Galera, 0–1813. SULU (Siboga).

LEUCOSIA AUSTRALIENSIS Miers.

Leucosia australiensis MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 322, pl. 27, fig. 1.

MINDORO, Mindoro Province, Puerto Galera, 0–1402.

LEUCOSIA CRANIOLARIS (Linnæus).

? *Cancer craniolaris* LINNÆUS, Mus. Lud. Ulricae (1764) 431; HERBST, Naturgesch. Krabben u. Krebse 1 (1782) 90, pl. 2, fig. 17.

Leucosia craniolaris FABRICIUS, Entom. Syst. Suppl. (1798) 350; MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 122; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 325.

MINDORO, Mindoro Province, Puerto Galera, 0–1812. LUZON, Manila Bay, 0218.

LEUCOSIA CUMINGI Bell.

Leucosia cumingi BELL, Trans. Linn. Soc. London 21 (1853) 290, pl. 31, fig. 3; IHLE, Decapoda Siboga Exped. Brachyura 85 (1918) 285.

Philippines (Siboga).

LEUCOSIA PUNCTATA Bell.

Leucosia punctata BELL, Trans. Linn. Soc. London 21 (1855) 286, pl. 30, fig. 5; IHLE, Decapoda, Siboga Exped. Brachyura 85 (1918) 277.

[13] Hist. Nat. Animaux san Vert. 5 (1818) 218.
[14] Challenger Rept. 27 (1888).
[15] Revision of the Hippidea. Journ. Linn. Soc. Zoöl. 14.

Leucosia affinis BELL, Trans. Linn. Soc. London 21 (1855) 287, pl. 30, fig. 6.

Philippines (Siboga).

LEUCOSIA BREVIMANA Bell.

Leucosia brevimana BELL, Trans. Linn. Soc. London 21 (1855) 288, pl. 30, fig. 7; IHLE, Decapoda, Siboga Exped. Brachyura 85 (1918) 315.

Philippines (Siboga).

LEUCOSIA MARMOREA Bell.

Leucosia marmorea IHLE, Decapoda, Siboga Exped. Brachyura 85 (1918) 316.

Philippines (Siboga).

LEUCOSIA PERLATA de Haan.

Leucosia perlata DE HAAN, Faun. Japon. (1850) 134; DE MAN, Notes Leyden Mus. 3 (1881) 124; ORTMANN, Decapod. Krebse, Strassburger Mus. Zoöl. Jahrb. Syst. 6 (1892) 584.

Leucosia pallida BELL, Trans. Linn. Soc. London 21 (1855) 283.

Leucosia parvimana STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 160.

Philippines (Bell).

Genus PHILYRA Leach

PHILYRA PLATYCHEIR de Haan.

Philyra platycheir DE HAAN, Faun. Japon. Crust. (1841) 192.

Philyra platychelra BELL, Trans. Linn. Soc. London 21 (1855) 300; DE MAN, Journ. Linn. Soc. London 22 (1888) 201.

MINDORO, Mindoro Province, Puerto Galera, 0–1853, 0–1811.

Genus PSEUDOPHILYRA Miers

PSEUDOPHILYRA WOOD-MASONI Alcock.

Pseudophilyra wood-masoni ALCOCK and ANDERSON, III, Zoöl. Investigator, Crust. (1897) pl. 30, fig. 6; IHLE, Decapoda, Siboga Exped. 85 (1918) 209.

Sulu Sea (Siboga).

Genus CRYPTOCNEMUS Stimpson

CRYPTOCNEMUS MACROGNATHUS Ihle.

Cryptocnemus macrognathus IHLE, Tijdschr. Ned. Dierk. Ver. (2) 14 (1915) 60; IHLE, Decapod. Siboga Exped. 85 (1918) 292, fig. 148.

North Ubian, 6° 7.5′ north latitude, 120° 26′ 0″ east longitude (Siboga).

ILLINÆ

Genus MYRA Leach

MYRA FUGAX (Fabricius).

Leucosia fugax FABRICIUS, Entom. Suppl. (1798) 351.

Myra fugax LEACH, Zoöl. Miscell. 3 (1817) 24; MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 126; DE HAAN, Faun. Japon. Crust. (1841)

134, pl. 33, fig. 1; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 313.

Myra carinata BELL, Trans. Linn. Soc. London (1855) 297, pl. 32, fig. 3.

LUZON, Ilocos Sur Province. MINDORO, sandy bottom. The specimens are in the collection of The Northern Luzon Junior College.

MYRA PUNCTATA Herbst.

Myra punctata HERBST, Krabben u. Krebse 1 (1782) 89, pl. 2, figs. 15, 16; DE MAN, Journ. Linn. Soc. London 22 (1888) 205.

Philippines (Siboga).

MYRA DARNLEYENSIS Haswell.

Myra darnleyensis HASWELL, Proc. Linn. Soc. N. S. W. 4 (1880) 52, pl. 5, fig. 4; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 315.

Myra kesileri IHLE, Decapod. Siboga Exped. III 85 (1918) 260.

Dredged from Celebes Sea, south of Mindanao, 6° 54' 0" north latitude, 122° 18' 0" east longitude, 10 fathoms (Challenger).

Genus MYRODES Bell

MYRODES EUDACTYLUS Bell.

Mirodes eudactylus BELL, Trans. Linn. Soc. London 21 (1855) 229, pl. 32, fig. 6; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 298; IHLE, Decapoda, Siboga Exped. 85 (1918) 262.

Myra eudactyla A. M. EDWARDS, Nouv. Archiv. Mus. Paris 10 (1874) 46, pl. 3, fig. 3.

Myrodes gigas HASWELL, Proc. Linn. Soc. N. S. Wales 4 (1879) 52, pl. 5, fig. 5.

Philippines (Bell).

Genus IXA Leach

IXA CYLINDRICUS var. MEGASPIS Adams and White.

Ixa cylindricus var. *megaspis* ADAMS and WHITE, Crust. (1848) 55, pl. 12, fig. 1; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 301; IHLE, Decapoda, Siboga Exped. 85 (1918) 285.

BOHOL (Samarang); N–334, locality not indicated.

Genus IPHICULUS Adams and White

IPHICULUS SPONGIOSUS Adams and White.

Iphiculus spongiosus ADAMS and WHITE, Samarang Crust. (1848) 57, pl. 13, fig. 5; LANCHESTER, Proc. Zool. Soc. London (1900) 766; STIMPSON, Smith. Misc. Coll. 49 (1907) 159, pl. 18, fig. 8; IHLE, Decapoda, Siboga Exped. 85 (1918) 252.

Philippines (Samarang).

Genus ARCANIA Leach

ARCANIA NOVEMSPINOSA (Adams and White).

Iphis novemspinosa ADAMS and WHITE, Crust. Samarang (1848) 56, pl. 13, fig. 1.

Arcania novemspinosa IHLE, Decapoda, Siboga Exped. 85 (1918) 265.

MINDORO (Siboga).

ARCANIA UNDECIMSPINOSA de Haan.

Arcania undecimspinosa DE HAAN, Faun. Japon. Crust. (1841) 125, pl. 33, fig. 8; IHLE, Decapoda, Siboga Exped. 85 (1918) 265.

Arcania granulosa MIERS, Trans. Linn. Soc. London (2) 1 (1877) 240, pl. 38, fig. 29.

Sulu Sea (Siboga).

Genus HETEROLITHADIA Wood-Mason

HETEROLITHADIA FALLAX (Henderson).

Ebalia fallax HENDERSON, Trans. Linn. Soc. London (2) 5 (1893) 402, pl. 38, figs. 4–6.

Heterolithadia fallax LAURIE, Rept. Pearl-Oyster Fish., Brachyura (1906) 365; IHLE, Decapoda, Siboga Exped. 85 (1918) 254.

Sulu Sea (Siboga).

Subfamily EBALINÆ Stimpson

Genus OREOPHORUS Rupprit

(= *Tlos* Adams and White)

OREOPHORUS (OREOTLOS) ANGULATUS (Rathbun).

Tlos angulatus RATHBUN, U. S. Fish Comm. Bul. (1903) 889, fig. 42; pl. 16, fig. 5.

Oreophorus (Oreotlos) angulatus IHLE, Decapoda, Siboga Exped. 85 (1918) 216.

Sulu Archipelago, TONGKIL (Siboga).

Family DORIPPIDÆ Dana

Genus DORIPPE Fabricius

DORIPPE QUADRIDENS Fabricius.[a]

Dorippe quadridens FABRICIUS, Suppl. Ent. (1798) 361; DE HAAN, Faun. Japon. Crust. (1841) 121; DE MAN, Journ. Linn. Soc. London 22 (1888) 206.

MINDORO, Mindoro Province, Puerto Galera, 0–57, 0–1849. CEBU.

Genus ETHUSA Roux

ETHUSA (ETHUSINA) GRACILIPES Miers.

Ethusa gracilipes MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 232, pl. 29, fig. 1.

Dredged from a depth of 700 fathoms in 12° 21′ north latitude, 122° 15′ 0″ east longitude.

[a] These crabs are usually found hooked under the umbrella of a jellyfish belonging to the Genus *Cassiopea*. The last pair of the legs are placed farther on the dorsal side and are modified for hooking.

CALAPPIDÆ

Subfamily CALAPPINÆ Dana

Genus CALAPPA Fabricius

CALAPPA GALLUS (Herbst).

Gallus gallus DE HAAN, Crust. Faun. Japon. (1837) 70.

Calappa gallus DANA, U. S. Explor. Exped. Crust. 13 (1852) 393; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 286; RATHBUN, Trans. Linn. Soc. London (2) 14 (1911) 197; IHLE, Decapod. Siboga Exped. 85 (1918) 181.

Calappa galloides STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1859) 71, var.

LUZON, Bataan Province, Mariveles, 0171.

CALAPPA PHILARGICUS (Linnæus).

Calappa cristata M. EDWARDS, Hist. Nat. Crust. 2 (1837) 105, pl. 20, figs. 1, 2.

Calappa philargicus NOBILI, Ann. Mus. Civ. St. Nat. Genova (2) 20 (1899) 249; IHLE, Decapoda, Brachyura, Siboga Exped. 85 (1918) 183.

BOHOL, Bohol Province, Inabanga, 0172. LUZON, Cagayan Province, Aparri, 0173. NEGROS, Negros Occidental Province, Sicaba, Cadiz Nuevo, 0228.

CALAPPA HEPATICA (Linnæus).

Calappa tuberculata DANA, U. S. Explor. Exped. 22 (1852) 393; A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. 10 (1874) 55.

Calappa hepatica HERKLOTS, Symbalae Carcin. (1861) 25; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 285; BORRADAILE, Faun. Geog. Maldive and Laccad. Archipelago, pt. 4 1 (1903) 456; IHLE, Decapoda, Siboga Exped. 85 (1918) 183.

SULU, Sitankay, 0176. BASUM, Sulu Province, 0178. LUZON, Tayabas Province, Polillo, 0181. Sulu Archipelago, Sanguisiapo (Siboga); 0–1268, locality not indicated.

MATUTIDÆ

Genus MATUTA Fabricius

MATUTA VICTRIX Fabricius.

Matuta victor FABRICIUS, Entom. Syst. Suppl. (1798) 369; M. EDWARDS, Hist. Nat. Crust. 2 (1837) 115, pl. 20, figs. 3–6.

Matuta victrix MIERS, Trans. Linn. Soc. (2) 1 (1877) 243, pl. 39, figs. 1–3; Rept. Voy. Challenger, Brachyura 17 (1886) 295.

PALAWAN, Iwahig, 0–25. LUZON, Manila Bay, 0185. MINDORO, Mindoro Province, Calapan, 0187. NEGROS, Occidental Negros Province, Sicaba, Cadiz Nuevo, 0227. MINDANAO, Zamboanga Province (Challenger), 10 to 20 fathoms.

MATUTA BANKSII Leach.

Matuta banksii MIERS, Trans. Linn. Soc. (2) 1 (1877) 245, pl. 40, figs. 1, 2; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 295;

Borradaile, Faun. Geog. Maldive and Laccad. Archipel. pt. 4 1 (1903) 436; Ihle, Decapoda, Siboga Exped. 85 (1918) 185.

Matuta picta Miers, Trans. Linn. Soc. (2) 1 (1877) 246, pl. 40, figs. 5–7.

Matuta obtusifrons Miers, Trans. Linn. Soc. (2) 1 (1877) 247.

Palawan, Iwahig, 0–339. Leyte, Leyte Province, Dulag, 0183. Bantayan, Cebu Province, 0184. Mindanao, Zamboanga (Challenger), 10 fathoms.

MATUTA LUNARIS (Forskål).

Matuta maculata Miers, Trans. Linn. Soc. (2) 1 (1877) 246, pl. 40, figs. 3, 4.

Matuta victrix + *maculata* de Man, Notes Leyden Mus. 3 (1881) 110, 116.

Matuta victrix + *crebrepunctata* de Man, Weber's Zoöl. Ergebn. einer Reise in Niederl. Ost-Indien 2 (1892) 351.

Matuta lunaris Stebbing, Mar. Invert. S. Africa 4 (1905) 54; Laurie, Brachyura, Rept. Pearl-Oyster Fish. 5 (1906) 356; Ihle, Decapoda, Siboga Exped. 85 (1918) 185.

Luzon, Rizal Province, Pasay, 0186. Negros, Occidental Negros Province, Cadiz Nuevo, 0226.

Tribe CYCLOMETOPA or CANCROIDEA [17]

CORYSTIDÆ

(Euryalidæ Rathbun)

Genus GOMEZA Gray

GOMEZA BICORNIS Gray.

Gomeza bicornis Gray, Zoöl. Miscell. (1831) 39; Miers, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 212.

Corystes (*Eidea*) *vigintispinosa* de Haan, in v. Siebold, Fauna Japon. (1835) 44, pl. 2, fig. 5.

Gomeza vigintispinosa A. M. Edwards, Nouv. Archiv. Mus. Hist. Nat. 10 (1874) 52, pl. 3, fig. 5.

Cebu, 0–1774. Mindoro, Mindoro Province, Puerto Galera. The Challenger specimen was collected south of Mindanao in 6° 54′ 0″ north latitude 122° 18′ 0″ east longitude from a depth of 10 fathoms.

[17] Alcock divided this tribe into five families, and arranged them in the descending order as follows:

1. Telphusidæ (Potamonidæ of other authors)
2. Xanthidæ
3. Portunidæ
4. Cancridæ
5. Corystidæ.

According to him, the Corystidæ are the lowest Cyclometopa and have the same relative position to the higher families of the tribe as the Raninidæ have to the higher families of the tribe Oxystomata.

According to Rathbun, the family should be Euryalidæ, because the genus from which it was established, *Eurycle* Weber, 1793, takes precedence of *Corystes* Latreille, 1802, both having the same type. Proc. Biol. Soc. Wash. 17 (1904) 17.

PORTUNIDÆ [18]

Subfamily LUPINÆ Alcock

(= Thalamitinæ Rathbun)

Genus CHARYBDIS de Haan

(= *Goniosoma* A. M. Edwards)

CHARYBDIS (GONIOSOMA) MILES (de Haan).

Portunus (Charybdis) miles DE HAAN, Fauna Japon Crust. p. 41, pl. 11, fig. 1.

Goniosoma miles A. M. EDWARDS, Archiv. du Mus. 10 (1861) 378.

Charybdis (Goniosoma) miles ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 62.

PALAWAN, Taytay, 0–1445.

CHARYBDIS (GONIOSOMA) NATATOR (Herbst).

Cancer natator HERBST, Krabben II 5 (1796) 156, pl. 40, fig. 1.

Goniosoma natator A. M. EDWARDS, Archiv. du Mus. 10 (1861) 370, 385.

Charybdis (Goniosoma) natator ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 61.

PALAWAN, Taytay, 0–1443. LUZON, Sorsogon Province, Bulan, 0120. MINDORO, Mindoro Province, Calapan, 0202.

CHARYBDIS RIVERS-ANDERSONI Alcock.

Charybdis (Goniosoma) rivers-andersoni ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 53.

PALAWAN, Taytay, 0–1766. LUZON, Bataan Province, Mariveles, 0–457.

CHARYBDIS (GONIOSOMA) CRUCIFERA (Fabricius).

Cancer sexdentatus HERBST, Krabben (1790), pl. 7, fig. 53.

Portunus crucifer FABRICIUS, Ent. Syst. Suppl. (1798) 364.

Charybdis crucifera DANA, U. S. Explor. Exped. Crust. 1 (1852) 286, pl. 17, fig. 11a–c; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 51.

Goniosoma crucifera A. M. EDWARDS, Archiv. du Mus. 10 (1861) 371, 385.

PALAWAN, Taytay, 0–1237. LUZON, Rizal Province, Malabon, 0121; Ilocos Sur Province; Ilocos Norte Province.

CHARYBDIS (GONIOSOMA) MERGUIENSIS (de Man).

Goniosoma merguiensis DE MAN, Journ. Linn. Soc. Zoöl. 22 (1887–88) 82, pl. 5, figs. 3, 4.

Goniosoma helleri HENDERSON, Trans. Linn. Soc. Zoöl. (2) 5 (1893) 375.

[18] Alcock divided this family into four subfamilies: Carcininæ, Portuninæ, Caphyrinæ, and Lupinæ. "The Carcininæ by way of Carcinus approach the Xanthidæ by way of Hoploxanthus."

Charybdis (Goniosoma) merguiensis ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 54.

MINDORO, Mindoro Province, Puerto Galera, 0–1788; Calapan, 0232. SAMAR, Samar Province, Catbalogan, 0123. LUZON, Rizal Province, Malabon, 0124; Manila, Farola, 0125. NEGROS, Occidental Negros Province, Sicaba, 0247.

CHARYBDIS (GONIOSOMA) ANISODON (de Haan).

Goniosoma anisodon A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 9 (1873) 167; ORTMANN, Zoöl. Jahrb. Syst. 7 (1894) 83.

Bought from the markets in Manila, 0–32. This species is considered one of the conspicuous links between *Charybdis* and *Thalamita*.

CHARYBDIS (GONIOHELLENUS) ORNATA A. M. Edwards.

Thalamita truncata DE HAAN, Faun. Japon. Crust. p. 43, pl. 2, fig. 3.
Charybdis truncata STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 39.
Goniosoma ornatum A. M. EDWARDS, Archiv. du Mus. 10 (1861) 376.
Charybdis (Goniohellenus) ornata ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 64.

LUZON, Bataan Province, Mariveles, 0234.

Genus THALAMITA Latreille, A. M. Edwards

THALAMITA STIMPSONI A. M. Edwards.

Thalamita stimpsoni A. M. EDWARDS, Archiv. du Mus. 10 (1861) 362, pl. 35, fig. 4; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 198; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 79.

MINDORO, Mindoro Province, Puerto Galera, 0–1713, 0–1789. MINDANAO, Zamboanga Province (Challenger), from a reef at a depth of 10 fathoms.

THALAMITA WOOD-MASONI Alcock.

Thalamita wood-masoni ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 90.

MINDORO, Mindoro Province, Puerto Galera, 0–1797.

THALAMITA INVESTIGATORIS Alcock.

Thalamita investigatoris ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 85.

MINDORO, Mindoro Province, Puerto Galera, 0–1784.

THALAMITA ADMETA (Herbst).

Cancer admeta HERBST, Krabben, III 3 : 40, pl. 58, fig. 1.
Thalamita savignyi A. M. EDWARDS, Archiv. du Mus. 10 (1861) 357; HENDERSON, Trans. Linn. Soc. Zoöl. (2) 5 (1893) 372.
Thalamita admeta ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 82.

PALAWAN, Taytay, 0–1776. MINDORO, Mindoro Province, Calapan, 0156. NEGROS, Occidental Negros Province, Sicaba, Cadiz Nuevo, 0241.

THALAMITA DANÆ Stimpson.

Thalamita crenata DANA, U. S. Explor. Exped. Crust. 1 (1852) 282, pl. 17, figs. 7a–b.

Thalamita danæ STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 39; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 77.

PALAWAN, Taytay, 0–1446. MINDORO, Mindoro Province, Calapan, 0150. LEYTE, Leyte Province, Polillo, 0153. BANTAYAN, Cebu Province, 0155.

THALAMITA CRENATA (Latreille).

Talamita prymna var. *crenata* RICHTERS, in Mobius Meereaf Maurit. p. 153.

Thalamita crenata DE MAN, Journ. Linn. Soc. London 22 (1888) 79; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 76.

JOLO, 0–1557. SAMAR, Samar Province, Borongan, 0–130. PANAY, Capiz Province, Iloilo Province, 0147; Barotac Nuevo, 0146. NEGROS, Oriental Negros Province, Tanjay, 0148.

THALAMITA PRYMNA (Herbst).

Cancer prymna HERBST, Krabben, III 3 : 41, pl. 52, fig. 2.

Thalamita crassimana DANA, Proc. Acad. Nat. Sci. Philad. (1852) 85; STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858–59) 39.

Thalamita prymna M. EDWARDS, Hist. Nat. Crust. 1 : 461; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 78.

MINDANAO, Apo Reef, 0–453. LUZON, Cavite Province, 0–972. MINDORO, Mindoro Province, Calapan, 0153. NEGROS, Occidental Negros Province, Cadiz Nuevo, Sicaba, 0242.

THALAMITA INTEGRA Dana.

Thalamita integra DANA, Proc. Acad. Nat. Sci. Philad. 6 (1852) 85; HENDERSON, Trans. Linn. Soc. Zoöl. (2) 5 (1893) 373; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 85.

NEGROS, Occidental Negros Province, Cadiz Nuevo, Sicaba, 0244.

THALAMITA SPINIMANA Dana.

Thalamita spinimana DANA, U. S. Explor. Exped. Crust. 1 (1852) 283, pl. 17, fig. 8; A. M. EDWARDS, Archiv. du Mus. Hist. Nat. 10 (1861) 364; DE MAN, Journ. Linn. Soc. London 22 (1888) 76, pl. 4, fig. 7.

MINDORO, Mindoro Province, Calapan, 0154. MACTAN, Cebu Province, 0160.

Genus THALAMITOIDES A. M. Edwards

THALAMITOIDES TRIDENS A. M. Edwards.

Thalamitoides tridens A. M. EDWARDS, Nouv. Archiv. Mus. Nat. Hist. Paris 5 (1869) 149, pl. 6, figs. 1–7; DE MAN, Notes Leyden Mus. 3 (1881) 99; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. 7 (1894).

Hedrophthalmus thalamitoides NAUCK, Zeitschr. f. Wiss. Zool. 34 (1880).

Philippines (Nauck).

Genus NEPTUNUS de Haan

NEPTUNUS PELAGICUS Linnæus.

Neptunus pelagicus DE HAAN, Faun. Japon. Crust. p. 37, pls. 9, 10; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 34.

Portunus cedo-nuli Bosc, Hist. Nat. Crust. 1: 221.

LUZON, Cavite Province, San Roque, 0–1759; Manila Bay, 0–1770; Rizal Province, Malabon, 0128. PANAY, Iloilo Province, Molo, 0131; Dumangas, 0132. BANTAYAN, Cebu Province, 0134. JOLO, Sulu Province, Sitankay, 0127.

One of the most common crabs sold in Philippine markets.

NEPTUNUS SANGUINOLENTUS (Herbst).

Cancer sanguinolentus HERBST, Krabben 1 (1790) 161, pl. 8, figs. 56, 57.

Cancer pelagicus FABRICIUS, Mant. Ins. 1: 318.

Neptunus sanguinolentus DE HAAN, Fauna Japon. Crust. p. 38; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 32.

LUZON, Camarines Sur Province, Lake Buhi, 0135. BOHOL, Inabanga, 0136.

NEPTUNUS (ACHELOUS) ORBICULARIS Richters.

Achelous orbicularis RICHTERS, in Mobius, Meerest. Maurit. p. 153, pl. 10, figs. 14, 15; HENDERSON, Trans. Linn. Soc. Zoöl. (2) 5 (1893) 371.

Neptunus (Achelous) orbicularis ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 47.

MINDORO, Mindoro Province, Puerto Galera, 0–549. JOLO, 0–1769.

NEPTUNUS (HELLENUS) HASTATOIDES (Fabricius).

Portunus hastatoides FABRICIUS, Ent. Syst. Suppl. p. 368.

Amphitrite hastatoides DE HAAN, Faun. Japon. Crust. p. 39, pl. 1, fig. 2.

Cancer hastatus HERBST, Krabben, III 3: 3, pl. 55, fig. 1.

Neptunus (Hellenus) hastatoides ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 38.

LUZON, Bataan Province, Mariveles, 0235.

NEPTUNUS XANTHUSII (Stimpson).

Achelous xanthusii STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1860) 228, pl. 39, fig. 1; HOLMES, Occas. Papers Cal. Acad. Sci. 7 (1900) 71.

MINDORO, Mindoro Province, Puerto Galera, 0–196.

NEPTUNUS (AMPHITRITE) RUGOSUS A. M. Edwards.

Neptunus rugosus A. M. EDWARDS, Archiv. Mus. Hist. Nat. 10 (1861) 335, pl. 33, fig. 3.

Neptunus (Amphitrite) rugosus MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 176.

Dredged during the Challenger Expedition in 11° 37' 0" north latitude, 123° 21' 0" east longitude, 18 fathoms, blue mud bottom.

NEPTUNUS (AMPHITRITE) SPINIPES Miers.

Neptunus (Amphitrite) spinipes Miers, Rept. Voy. Challenger Brachyura, Zoöl. 17 (1886) 175.

Neptunus (Hellenus) spinipes Alcock, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 39.

Dredged 11° 37' 0" north latitude, 123° 21' 0" east longitude, 18 fathoms, blue mud bottom (Challenger).

NEPTUNUS (ACHELOUS) GRANULATUS (Milne Edwards).

Lupa granulata M. Edwards, Hist. Nat. Crust. 1 (1834) 454.

Portunus (Amphitrite) gladiator de Haan (not Fabr.), Crust. v. Siebold, Faun. Japon. (1837) 65, pl. 18, fig. 1.

Achelous granulatus A. M. Edwards, Archiv. Mus. Hist. Nat. 10 (1861) 344.

Neptunus (Achelous) granulatus Miers, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 180; Ortmann, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 72.

Cebu (Thallwitz); Mindanao, Zamboanga Province (Challenger), 10 fathoms.

NEPTUNUS (AMPHITRITE) TENUIPES de Haan.

Neptunus (Amphitrite) tenuipes Haswell, Cat. Austral. Crust. (1882) 83; Thallwitz, Abh. Mus. Dresden (1891) 3, pl. 48; Ortmann, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 74.

Cebu (Thallwitz).

NEPTUNUS (NEPTUNUS) PELAGICUS var. **TRITUBERCULATUS** Miers.

Neptunus (Neptunus) pelagicus var. *trituberculatus* Miers, Ann. Nat. Hist. (4) 17 (1876) 221; Ortmann, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 74.

Philippines (Challenger); Manila (Heller).

Genus SCYLLA de Haan

SCYLLA SERRATA (Forskål).

Cancer serratus Forskål, Descript. Anim. p. 90.

Scylla serrata de Haan, Faun. Japon. Crust. p. 44; Stimpson, Proc. Acad. Nat. Sci. Philad. (1858) 38; Alcock, Carc. Faun. India, Journ. Asiat. Soc. Bengal 68 (1899) 27.

Scylla tranquebarica Dana, U. S. Explor. Exped. Crust. 1 (1852) 270.

Mindoro, Mindoro Province, Puerto Galera, 0–1312. Palawan, Taytay, 0–1102. Luzon, Manila Bay, 0140; Cagayan Province, Aparri, 0143; Camarines Sur Province, Calabanga, 0145. Panay, Iloilo Province, Dumangas, 0144.

These crabs grow to considerable size and constitute the most valuable edible species. They are widely distributed, but abound especially in places where there are extensive mangrove swamps.

CARCININÆ

Genus LISSOCARCINUS Adams and White

LISSOCARCINUS LÆVIS Miers.

Lissocarcinus lævis MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 205, pl. 17, fig. 3.

Dredged south of MINDANAO, at 6° 54' 0" north latitude, 122° 18' 0" east longitude, 10 fathoms.

LISSOCARCINUS BOHOLENSIS Semper (ined.) and Nauck.

Lissocarcinus boholensis MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 206.

Philippines, possibly BOHOL.

PODOPHTHALMINÆ [19]

Genus PODOPHTHALMUS Lamarck

PODOPHTHALMUS VIGIL (Fabricius).

Portunus vigil FABRICIUS, Entom. Syst. Suppl. (1798) 362.

Podophthalmus vigil LEACH, Zoöl. Miscell. 2 (1815) 149, pl. 116; A. M. EDWARDS, Archiv. Mus. Hist. Nat. 10 (1861) 420; MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 207; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 87.

BANTAYAN, Cebu Province, Hagnaya, 0138.

Occasionally sold in Manila markets.

XANTHIDÆ [20]

XANTHINÆ

Alliance CARPILOIDEA

Genus CARPILIUS Leach, Desmarest, A. M. Edwards

CARPILIUS MACULATUS Linnæus.

Cancer maculatus LINNÆUS, Syst. Nat. 12 : 1042.

Cancer rubber RUMPHIUS, Amboinische Raritetkamer, p. 18, pl. 10, fig. 1.

Carpilius maculatus MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 111; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898-99) 79.

[19] Some authors placed the Podophthalminæ as a subfamily under Portunidæ, while others, like Ortmann, recognized it as distinct.

[20] This family is divided into seven subfamilies:

1. Actæinæ,
2. Chlorodinæ,
3. Xanthinæ,
4. Menippinæ,
6. Pilumninæ,
5. Oziinæ,
7. Eriphiinæ.

MINDORO, Mindoro Province, Puerto Galera, 0–1642; Calapan, 0097. LUZON, Ilocos Sur Province; Ilocos Norte Province.

Widely distributed in the Philippines, commonly found in rocky bottom.

CARPILIUS CONVEXUS (Forskål).

Cancer convexus FORSKÅL, Descript. Anim. p. 88.
Cancer aspersus HERBST, Krabben 1 (1790) 264, pl. 21, fig. 1.
Carpilius convexus RUPPELL, 24 Krabben roth. Meer. p. 13, pl. 3, fig. 2; pl. 6, fig. 5; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 80.

MINDORO, Mindoro Province, Calapan, 0096. SILONAY, 0–1532. LUZON, Ilocos Sur Province; Ilocos Norte Province.

Of wide distribution.

Genus CARPILODES Dana, A. M. Edwards

CARPILODES BELLUS (Dana).

Actæodes bellus DANA, Proc. Acad. Nat. Sci. Philad. (1852) 78; U. S. Explor. Exped. Crust. 13 (1852) 196, pl. 11, fig. 2.
Actæa bella A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. 1 (1865) 261.
Carpilodes bellus MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 134.

MINDANAO, from the beach at Zamboanga Province (Challenger).

Genus LIOMERA Dana

LIOMERA CINCTIMANA (White).

Carpilius cinctimanus WHITE, in Jukes' Voy. H. M. S. "Fly" 2: 336, pl. 2, fig. 3.
Liomera cinctimana DANA, Silliman's Journ. (2) (1851) 75; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 88.
Carpilodes cinctimanus MIERS, Ann. Mag. Nat. Hist. (5) 5 (1880) 234.

MINDORO, Mindoro Province, Puerto Galera, 0–166.

Alliance ZOZYMOIDEA

Genus LOPHOZOZYMUS A. M. Edwards

LOPHOZOZYMUS OCTODENTATUS (M. Edwards).

Xantho octodentatus M. EDWARDS, Hist. Nat. Crust. 1: 398.
Cancer serratilis RUMPHIUS, Amboinische Rariteitk. pl. 9; pl. 6, fig. m.
Lophozozymus octodentatus ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 106.

PALAWAN, Taytay, 0–1050.

Genus LOPHACTEA A. M. Edwards

LOPHACTEA GRANULOSA (Ruppell).

Xantho granulosus RUPPELL, 24 Krabben roth. Meer. p. 24, pl. 5, fig. 3.
Ægle granulosus DE HAAN, Faun. Japon. Crust. p. 17 (name only).
Atergatis limbatus DANA, U. S. Explor. Exped. Crust. pt. 1 (1852) 157.

Lophactea granulosa ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 459; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 101.

BANTAYAN, Cebu Province, 0–244. Sulu Sea (Dana).

Genus LOPHOPANOPEUS Rathbun

LOPHOPANOPEUS BELLUS (Stimpson).

Xantho bella STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1860) 204, pl. 3, fig. 2.

Xanthodes hemphilii LOCKINGTON, Proc. Calif. Acad. Sci. 7 (1876) 32.

Lophoxanthus bellus A. M. EDWARDS, Crust. Reg. Mex. (1879) 257 (part), pl. 40, figs. 4–4e.

Lophozozymus (Lophoxanthus) bellus MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 115.

Lophopanopeus bellus RATHBUN, U. S. N. M. Bul. 152 (1930) 320, pls. 150–151.

The tag number is badly eaten up, and the place is not indicated.

LOPHOPANOPEUS FRONTALIS (Rathbun).

Lophozozymus (Lophoxanthus) frontalis RATHBUN, Proc. U. S. N. M. 16 (1893) 236.

Lophoxanthus frontalis HOLMES, Occas. Papers California Acad. Sci. 7 (1900) 64, pl. 1, figs. 5, 6.

Lophopanopeus frontalis RATHBUN, U. S. N. M. Bul. 152 (1930) 323, pl. 152.

PALAWAN, Taytay, 0–1024.

Genus ATERGATOPSIS A. M. Edwards

ATERGATOPSIS SIGNATA (Adams and White).

Carpilius signatus ADAMS and WHITE, Zoöl. Voy. "Samarang" Crust. (1848), pl. 10, fig. 1.

Atergatopsis signatus A. M. EDWARDS, Nouv. Archiv. Mus. Paris, Hist. Nat. 1 (1866) 253; RATHBUN, Marine Brachyura, Trans. Linn. Soc. London, Zoöl. 14: 214.

PARELLONES, Mindoro Province, Puerto Galera, 0–1756.

Genus ATERGATIS de Haan, A. M. Edwards

ATERGATIS FLORIDUS (Rumphius).

Cancer floridus RUMPHIUS, Amboinisch. Rariteitkamer p. 16, pl. 7, fig. 5.

Atergatis floridus DE HAAN, Faun. Japon. Crust. p. 46; MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 112; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 98.

POLILLO, Tayabas Province, 0090. DINAGAT, Surigao Province, 0091. SIASI, Sulu Province, C092. MINDORO, Mindoro Province, Calapan, 0094. CEBU (Challenger), from a reef.

ATERGATIS INTEGERRIMUS var. TYPICA Ortmann.

Cancer integerrimus M. EDWARDS, Hist. Nat. Crust. 1 (1834) 374.

Atergatis subdivisus WHITE, Proc. Zoöl. Soc. London 15 (1847) 224; ADAMS and WHITE, Zoöl. Voy. Samarang (1848) 38, pl. 8, fig. 3.

Atergatis integerrimus DANA, U. S. Explor. Exped. Crust. (1852) 158.

Atergatis integerrimus var. *typica* ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 462.

MINDORO, Mindoro Province, Puerto Galera, 0–1744, Calapan, 0095. NEGROS, Occidental Negros Province, Sicaba, Cadiz Nuevo, 0329.

Alliance XANTHOIDEA

Genus XANTHO Leach

XANTHO (LEPTODIUS) CAVIPES (Dana).

Chlorodius cavipes DANA, Proc. Ann. Nat. Sci. Philad. (1852) 79.

Leptodius cavipes DE MAN, Journ. Linn. Soc. Zoöl. 22 (1887–88) 34.

Xantho (Leptodius) cavipes ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 122.

MINDORO, Mindoro Province, Puerto Galera, 0–1851.

XANTHO (LEPTODIUS) EUCLYPTUS Alcock.

Xantho (Leptodius) euglyptus ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 121.

MINDORO, Mindoro Province, Puerto Galera, 0–166, 0–1778.

XANTHO BIDENTATUS A. M. Edwards.

Xantho bidentatus A. M. EDWARDS, Ann. Soc. Ent. France (4) 7 (1867) 206; MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 126, pl. 11, fig. 4; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 67 (1898) 114.

LEYTE, Leyte Province, Cabalian, 0119. MINDANAO, Zamboanga Province (Challenger).

XANTHO (LEPTODIUS) NUDIPES (Dana).

Chlorodius nudipes DANA, Proc. Ann. Nat. Sci. Philad. (1852) 79.

Leptodius nudipes A. M. EDWARDS, Nouv. Archiv. du Mus. 9 (1873) 225.

Xantho exaratus var. *nudipes* ORTMANN, Zoöl. Jahrb. Syst. 7 (1893–94) 447.

Xantho (Leptodius) nudipes ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 121.

SITANKI, Sulu Province, 0105.

XANTHO (LEPTODIUS) EXARATUS (M. Edwards).

Chlorodius exaratus M. EDWARDS, Hist. Nat. Crust. 1 : 402; 4 : 71.

Xantho affinis DE HAAN, Faun. Japon. Crust. p. 48, pl. 13, fig. 8.

Leptodius exaratus A. M. EDWARDS, Nouv. Archiv. du Mus. 4 (1868) 71.

Xantho (Leptodius) exaratus ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99).

BANTAYAN, Cebu Province, 0–6.

XANTHO LAMARCKII Milne Edwards.

Xantho lamarckii MILNE EDWARDS, Hist. Nat. Crust. 1 (1834) 391; ORTMANN, Decapod. Krebse Strassburger, Mus. Zoöl. Jahrb. Syst. 7 (1894) 448.

Xantho cultrimanus WHITE, Proc. Zoöl. Soc. London 15 (1847) 225; ADAMS and WHITE, Zoöl. Voy. Samarang Crustacea (1850) 39.
Xanthodes granosomanus DANA, U. S. Explor. Exped. Crust. (1852) 175, pl. 8, fig. 10.
Xanthodes lamarckii A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 9 (1878) 200, pl. 7, fig. 8.

Philippines (Adams and White).

Genus LEPTODIUS A. M. Edwards

LEPTODIUS EXARATUS var. SANGUINEUS Miers.

Chlorodius sanguineus M. EDWARDS, Hist. Nat. Crust. 1 (1834) 402; DANA, U. S. Explor. Exped. Crust. 13 (1852) 207, pl. 11, fig. 11.
Leptodius exaratus var. *sanguineus* MIERS, Proc. Zoöl. Soc. London (1877) 134, et synonyma; MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 138.

From the beach at Zamboanga, MINDANAO (Challenger).

Subfamily ETISINÆ Ortmann

Genus ETISUS Milne Edwards

ETISUS UTILIS Lucas.

Etisus utilis LUCAS, in Jacquinot, Voy. Astralabe, Crust. 3 (1853) 27, pl. 2, fig. 6; A. M. EDWARDS, Nouv. Archiv. Mus. Paris (1873) 233; ALCOCK, Carc. Faun. India, Journ. Asiat. Soc. Bengal 67 (1898–99) 130.

MINDORO, Mindoro Province, Puerto Galera, 0–389.

ETISUS LÆVIMANUS Randall.

Etisus lævimanus RANDALL, Journ. Acad. Nat. Sci. Philad. 8 (1839) 115; DANA, U. S. Explor. Exped. Crust. (1852) 185, pl. 10, fig. 1; HILGENDORF, Mon.-Ber. Ak. Wiss. Berlin (1878) 791; ORTMANN, Zoöl. Jahrb. Syst. 7 (1894) 473.

Philippines (Hilgendorf).

Genus ETISODES Dana

ETISODES ANACLYPTUS M. Edwards.

Etisus anaglyptus MILNE EDWARDS, Hist. Nat. Crust. (1834) 411; DE MAN, Notes Leyden Mus. 13 (1891) 7.
Etisodes anaglyptus HASWELL, Cat. Austral. (1882) 55; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 471.

Philippines (Miers).

ACTÆINÆ

Genus ACTÆA de Haan, A. M. Edwards

ACTÆA TOMENTOSA (M. Edwards).

Zozymus tomentosus M. EDWARDS, Hist. Nat. Crust. 1 (1834) 385.
Actæa tomentosa H. M. EDWARDS, Nouv. Archiv. du Mus. (1865) 262; ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 140.

Actæodes tomentosus DANA, U. S. Explor. Exped. Crust. 1 (1852) 197; MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 135.

COMIRAN, Palawan, 0089.

ACTÆA SUFFUSCULA Rathbun.

Actæa suffuscula RATHBUN, Trans. Linn. Soc. London, Zool. 14 : 220.

MINDORO, Mindoro Province, Puerto Galera, 0–1138.

ACTÆA HIRSUTISSIMA (Ruppell).

Xantho hirsutissimus RUPPELL, 24 Krabben roth. Meer. p. 26, pl. 5, fig. 6.

Actæa hirsutissima DE HAAN, Faun. Japon. Crust. p. 18; DANA, U. S. Explor. Exped. 1 (1852) 164.

Actæa hirsutissima ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 144.

COMIRAN, Palawan Province, 0088.

ACTÆA RUPPELLII (Krauss).

Ægle ruppellii KRAUSS, Süd-Afrik. Crust. (1843) 28, pl. 1, fig. 1.

Ægle rugata ADAMS and WHITE, Zoöl. Voy. Samarang (1850) 43, pl. 8, fig. 5; MIERS, Ann. Mag. Nat. Hist. (5) 5 (1880) 232.

Actæa ruppellii A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 1 (1865) 270; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 454.

Locality not indicated, 0–839.

CHLORODINÆ

Alliance CHLORODOIDA

Genus CHLORODIUS A. M. Edwards

CHLORODIUS NIGER (Forskål).

Cancer niger FORSKÅL, Descript. Anim. p. 89.

Chlorodius niger RUPPELL, 24 Krabben roth. Meer. p. 20, pl. 4, fig. 7; pl. 6, fig. 14; DANA, U. S. Explor. Exped. Crust. (1852) 216, pl. 12, fig. 5.

Chlorodius hirtipes WHITE, P. Z. S. (1848) 226; ADAMS and WHITE, Zoöl. Voy. Samarang, Crust. (1848) 40, pl. 11, fig. 4.

COMIRAN, Palawan Province, 0100. SIASI, 0101. Sulu Sea (Dana).

Genus CHLORODOPSIS A. M. Edwards

CHLORODOPSIS PILUMNOIDES (White).

Chlorodius pilumnoides WHITE, P. Z. S. (1847) 226; WHITE, Ann. Mag. Nat. Hist. (2) 2 (1848) 286; ADAMS and WHITE, Zoöl. Voy. Samarang, Crust. (1848) 41, pl. 9, fig. 3.

Chlorodopsis pilumnoides DE MAN, Journ. Linn. Soc. Zoöl. 22 (1887–88) 34; ORTMANN, Zoöl. Jahrb. Syst. 7 (1893–94) 470; ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 167.

COMIRAN, Palawan Province, 0102. Locality not indicated, 0–1755.

Genus PHYMODIUS A. M. Edwards

PHYMODIUS UNGULATUS (M. Edwards).

Chlorodius ungulatus M. EDWARDS, Hist. Nat. Crust. 1 (1834) 400, pl. 16, figs. 6–8; DANA, U. S. Explor. Exped. Crust. (1852) 205, pl. 11, fig. 8.

Chlorodius areolatus ADAMS and WHITE, Zoöl. Voy. Samarang, Crust. (1850) 41, pl. 11, fig. 3.

Phymodius ungulatus A. M. EDWARDS, Nouv. Archiv. Mus. Paris 9 (1873) 218; HASWELL, Cat. Austral. Crust. (1882) 59.

Phymodius monticulosus MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 139; ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 163.

COMIRAN, Palawan Province, 0099. MINDANAO, Zamboanga Province (Challenger).

Alliance XANTHODIOIDA

Genus XANTHODES Dana

XANTHODES DEPRESSUS White.

Xanthodes depressus MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 127.

MENIPPINÆ

Alliance MENIPPIOIDA

Genus MENIPPE de Haan

MENIPPE CONVEXA Rathbun.

Menippe convexa RATHBUN, Proc. U. S. N. M. 16 (1893) 239; RATHBUN, Brachyura and Macrura of Hawaiian Islands (1906) 861.

Locality not indicated, 0–1557.

OZIINÆ

Alliance OZIOIDA

Genus EPIXANTHUS Heller

EPIXANTHUS DENTATUS (White).

Panopeus dentatus WHITE, P. Z. S. (1847) 226.

Heteropanope dentatus STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 35.

Epixanthus dentatus MIERS, Ann. Mag. Nat. Hist. (5) 5 (1880) 35; ORTMANN, Zoöl. Jahrb. Syst. 7 (1894) 478; ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 185.

PALAWAN, Malapaya Sound, 0–1025.

EPIXANTHUS FRONTALIS (Milne Edwards).

Ozius frontalis MILNE EDWARDS, Hist. Nat. Crust. 1 (1834) 406.

Epixanthus frontalis HELLER, Novara, Crust. p. 20; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 477; ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 185.

MINDORO, Mindoro Province, Puerto Galera, 0–1790.

Alliance RUPPELLIOIDA

Genus BAPTOZIUS Alcock

BAPTOZIUS VINOSUS (Milne Edwards).

Ruppellia vinosa MILNE EDWARDS, Hist. Nat. Crust. 1 (1834) 422.
Euruppellia vinosa DE MAN, in Weber's Zoöl. Ergeb. Niederl. Ost.-Ind. 2 (1892) 278, pl. 1, fig. 1.
Baptozius vinosus ALCOCK, Carc. Fauna, India, Journ. Asiat. Bengal 67 (1898–99) 189.

MINDORO, Mindoro Province, Puerto Galera, 0–719, 0–1778.
Quite common under stones at the edges of marshy swamps.

PILUMNINÆ

Alliance PILUMNOIDA

Genus PILUMNUS Leach

PILUMNUS ORBITOSPINIS Rathbun.

Pilumnus orbitospinis RATHBUN, Trans. Linn. Soc. London, Zool. 14: 229.

LUZON, Albay Province, Legaspi, 0–971. SAMAR, Samar Province, Catbalogan, 0–992.

PILUMNUS VESPERTILIO (Fabricius).

Cancer vespertilio FABRICIUS, Ent. Syst. 2 : 463, and Suppl. p. 338.
Pilumnus ursulus ADAMS and WHITE, Zoöl. Voy. Samarang, Crust. (1850) 45, pl. 9, fig. 6.
Pilumnus vespertilio A. M. EDWARDS, Nouv. Archiv. Mus. 9 (1873) 242; HENDERSON, Trans. Linn. Soc. Zool. (2) 5 (1893) 365; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 67 (1898–99) 192.

MINDORO, Mindoro Province, Puerto Galera, 0–194; Calapan, 0109. BANTAYAN, Cebu Province, 0–208. LUZON, Bataan Province, Mariveles, 0–284; Ilocos Sur Province.
One of the commonest littoral crabs on rocky shores.

PILUMNUS GEMMATUS Stimpson.

Pilumnus gemmatus STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1860) 214; RATHBUN, U. S. N. M. Bul. 152 (1930) 513, pl. 207, figs. 1–3.

SAMAR, Samar Province, Catbalogan, 0107.

PILUMNUS DE HAANI Miers.

Pilumnus de haani MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 155, pl. 14, fig. 1; ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 198.

Dredged at 11° 37′ 0″ north latitude, 123° 31′ 0″ east longitude, from depth of 18 fathoms in mud bottom (Challenger).

PILUMNUS SPINOHIRSUTUS (Lockington).

Acanthus spino-hirsutus LOCKINGTON, Proc. Calif. Acad. Sci. 7 (1876) 33.

Pilumnus spinohirsutus STIMPSON and KINGSLEY, Bul. Essex Inst. 9 (1877) 107 (part); RATHBUN, U. S. N. M. Bul. 152 (1930) 503, pl. 203.

SAMAR, Samar Province, Catbalogan, 0–905.

PILUMNUS SCABRICULUS Adams and White.

Pilumnus scabriusculus ADAMS and WHITE, Crust. Zoöl. Samarang (1848) 44, pl. 9, fig. 5; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886).

JOLO, 0–1758. MINDANAO, Zamboanga Province.

ERIPHIINÆ [21]

Alliance ERIPHIOIDA

Genus ERIPHIA Latreille

ERIPHIA SPINIFRONS (Herbst).

Eriphia spinifrons M. EDWARDS, Hist. Nat. Crust. 1 (1834) 426; Atlas Cuvier Regn. Anim. (1849) pl. 14, fig. 1; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 479.

NEGROS, Oriental Negros Province, Zamboanguita, 0–103.

ERIPHIA SCABRICULA Dana.

Eriphia gonagra KRAUSS, Süd-Afrik. Crust. (1843) 36.

Eriphia scabricula DANA, U. S. Explor. Exped. Crust. (1852) 247, pl. 14, fig. 5; A. M. EDWARDS, Nouv. Archiv. Mus. Paris 9 (1873) 256; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 480.

Sulu Sea (Dana).

ERIPHIA LÆVIMANA Latreille.

Eriphia lævimana M. EDWARDS, Hist. Nat. Crust. 1 (1834) 427; DANA, U. S. Explor. Exped. Crust. (1852) 249, pl. 14, fig. 7; HILGENDORF, Decken's Reise, Bd. 3 1 (1869) 75; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Syst. 7 (1894) 480.

Eriphia trapeziformis HESS, Decapod. Krebse Ost-Austral. (1865) 9, pl. 6, fig. 4.

Genus TRAPEZIA Latreille

(= *Grapsilus* MacLeay)

TRAPEZIA CYMODOCE (Herbst).

Cancer cymodoce HERBST, Krabben u. Krebse III, pl. 51, fig. 5.

Trapezia dentata A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. 9 (1873) 261, pl. 9.

Trapezia cymodoce MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 166; DE MAN, Journ. Linn. Soc. 22 (1888) 69.

MINDORO, Mindoro Province, Puerto Galera 0–1763. MINDANAO, Zamboanga Province (Challenger) from a reef. These are coral crabs.

[21] In the Oziinæ and Eriphiinæ, the family Xanthidæ approaches the Telphusidæ (Potamonidæ); by the Pilumninæ and Xanthinæ it is linked with the section Carcinæ of the Portunidæ and, through these, with the Cancridæ.—ALCOCK.

TRAPEZIA CYMODOCE var. DENTATA Dana.

Trapezia dentata DANA, U. S. Explor. Exped. Crust. (1852) 258, pl. 15, figs. 6, 7.

Trapezia ferruginea DANA, ibid, 260, pl. 16, fig. 1.

Trapezia minuta JACQUINOT et LUCAS, Voy. Pole Süd-Zool. Crust. 3 (1853) 43, pl. 4, fig. 10.

Trapezia cymodoce var. *dentata* ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 483.

Sulu Sea (Dana).

TRAPEZIA AREOLATA Dana.

Trapezia areolata DANA, U. S. Explor. Exped. Crust. (1852) 259, pl. 16, figs. 8, 9.

Trapezia reticulata STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 37.

Trapezia areolata var. *inermis* A. M. EDWARDS, Nouv. Archiv. Mus. Paris 9 (1873) 259, pl. 10, fig. 6.

MINDORO, Mindoro Province, Puerto Galera, 0–1764. Sulu Sea (Dana).

TRAPEZIA RUFOPUNCTATA (Herbst).

Cancer rufopunctata HERBST, Krabben 3 (1799) 54, pl. 47, fig. 6.

Trapezia rufopunctata MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 167; ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 67 (1898–99) 222.

MINDORO, Mindoro Province, Puerto Galera, 0–522, 0–1712, 0–1762. MINDANAO, Zamboanga Province (Challenger), 10 fathoms.

Genus QUADRELLA Dana

QUADRELLA CORONATA Dana.

Quadrella coronata DANA, U. S. Explor. Exped. Crust. (1852) 266, pl. 16, fig. 5; ORTMANN, Zoöl. Jahrb. Syst. 10 (1898) 210.

Quadrella nitida SMITH, Proc. Boston Soc. Nat. Hist. 12 (1869) 288; LOCKINGTON, Proc. Acad. Calif. Sci. 7 (1876) 105.

Sulu Sea (Dana).

POTAMONIDÆ [22]

(= Telphusidæ)

Genus POTAMON Savigni

(= *Telphusa* Latreille)

POTAMON (PARATELPHUSA) GRAPSOIDES (Milne Edwards).

Telphusa grapsoides WHITE, List Crust. Brit. Mus. (1847) 30; MILNE EDWARDS, Ann. Sci. Nat. Zoöl. (3) 20 (1853) 212; DE MAN, Journ. Linn. Soc. London 22 (1887) 96; RÜPPELL, Zoöl. Jahrb. Syst. 5 (1895) 2.

[22] "The Telphusidæ are the highest Cyclometopes, and approach the Catometopa. They appear to me from consideration both of structure and habitat, to have branched off from the Oziinæ or Eriphiinæ stocks, but are now inhabitants of fresh water or damp jungle."—ALCOCK, Journ. Asiat. Soc. Bengal 66.

Telphusa hydrodromus GERSTAECKER, Arch. f. Naturg. 22 1 (1856) 150, part.

Potamon grapsoides DE MAN, Ann. Mus. Civ. Stor. Nat. Genova (2) 19 (1898) 430.

Potamon (Potamon) grapsoides RATHBUN, Nouv. Archiv. du Mus. IV 6 (1904) 300, pl. 13, fig. 9.

These crabs are abundant in Luzon, Laguna Province, Los Baños, Molawin Creek; San Juan River, Calamba, and in regions around Laguna Bay. The specimen in the collection of the Goettinger Museum came from Lake Mainit.

POTAMON (TELPHUSA) ANGUSTIFRONS M. Edwards.

Telphusa angustifrons A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 5 (1869) 171; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 3, pl. 1, fig. 1.

NEGROS, Oriental Negros Province, Luzuriaga, 0161.

POTAMON (TELPHUSA) SINUATIFRONS (M. Edwards).

Telphusa sinuatifrons M. EDWARDS, Ann. Sci. Nat. III Zool. 20 (1853) 211; A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. 5 (1869) 177, pl. 10, fig. 2; MIERS, Ann. Mag. Nat. Hist. V 5 (1880) 305; Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 214, pl. 18, fig. 1; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 2.

MINDANAO, Pasonanca (Challenger). Locality not indicated, 0167. The Goettinger Zoölogical Museum has three specimens collected from the Philippines.

POTAMON (TELPHUSA) LESCHENAULTI (M. Edwards).

Telphusa leschenaulti A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 5 (1869) 165, pl. 8, fig. 3; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 2.

BOHOL (Bürger).

POTAMON (TELPHUSA) PHILIPPINA Martens.

Telphusa philippina MARTENS, Monatsber. K. Preuss. Ak. Wiss. Berlin (1860) 609; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 4, pl. 1, fig. 3.

LUZON, Agno River, Pataban; Bataan Province, Mariveles. CAMIGUIN.

POTAMON (TELPHUSA) MONTANA Bürger.

Telphusa montana BÜRGER, Zool. Jahrb. Syst. 8 (1895) 6, pl. 1, fig. 5.

Bürger's specimen came from Mount Data, Luzon, from an altitude of 7,000 ft.

POTAMON (PARATELPHUSA) TRIDENTATA (Milne Edwards).

Paratelphusa tridentata MILNE EDWARDS, Ann. Sci. Nat. (3) Zoöl. 20 (1853) 213; MILNE EDWARDS, Archiv. Mus. Paris 7 (1854–55) 171, pl. 13, fig. 1; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 487.

Locality not indicated, 0169.

POTAMON (TELPHUSA) LÆVIS Wood-Mason.

LUZON, Camarines Sur Province, Lake Buhi, 0166.

Genus PSEUDOTELPHUSA

PSEUDOTELPHUSA ANGULATA Rathbun.

Pseudotelphusa angulata RATHBUN, Proc. Biol. Soc. Wash. 28 (1915) 93; PEARSE, Proc. U. S. N. M. 49 (1915) 552, pl. 72, figs. 1–5.

MINDORO, Mindoro Province, Puerto Galera, 0–1863. From under bowlders at the head of Tabinay Creek.

Tribe CATOMETOPA

Family GONEPLACIDÆ Dana

CARCINOPLACINÆ

Genus CARCINOPLAX Milne Edwards

CARCINOPLAX BISPINOSA Rathbun.

Carcinoplax bispinosa RATHBUN, Proc. U. S. N. M. 48 (1914) 137.

North of MARINDUQUE. LUZON, Tayabas light (outer), 90 fathoms (Albatross).

CARCINOPLAX SPINOSISSIMA Rathbun.

Carcinoplax spinosissima RATHBUN, Proc. U. S. N. M. 48 (1914) 139.

Between CEBU and BOHOL. CEBU, Lauis Point, 165 fathoms (Albatross).

CARCINOPLAX CONFRAGOSA Rathbun.

Carcinoplax confragosa RATHBUN, Proc. U. S. N. M. 48 (1914) 140.

Between CEBU and BOHOL. BOHOL, Cruz Point, 127 fathoms (Albatross).

CARCINOPLAX PURPUREA Rathbun.

Carcinoplax purpurea RATHBUN, Proc. U. S. N. M. 48 (1914) 140.

Near MARINDUQUE. LUZON, Tayabas Light (outer), 90 fathoms (Albatross).

CARCINOPLAX ANGUSTA Rathbun.

Carcinoplax angusta RATHBUN, Proc. U. S. N. M. 48 (1914) 142.

Near MARINDUQUE. LUZON, Tayabas Light (outer), 90 fathoms (Albatross).

CARCINOPLAX VERDENSIS Rathbun.

Carcinoplax verdensis RATHBUN, Proc. U. S. N. M. 48 (1914) 143.

Verde Island Passage. SOMBRERO, 394 fathoms (Albatross).

CARCINOPLAX SPECULARIS Rathbun.

Carcinoplax specularis RATHBUN, Proc. U. S. N. M. 48 (1914) 143.

Off southern LUZON: SOMBRERO, 159 fathoms (Albatross).

Genus PSOPHETICUS Wood-Mason

PSOPHETICUS HUGHI Rathbun.

Psopheticus hughi RATHBUN, Proc. U. S. N. M. 48 (1914) 144.

Northern MINDANAO, Macabalan Point, 200 to 220 fathoms (Albatross).

GONEPLACINÆ

Genus GONEPLAX Leach

GONEPLAX RENOCULIS Rathbun.

Goneplax renoculis RATHBUN, Proc. U. S. N. M. 48 (1914) 145.

Off southern LUZON. MALAYATUAN, 80 to 102 fathoms (Albatross).

RHIZOPINÆ

Genus CERATOPLAX Stimpson

CERATOPLAX FULGIDA Rathbun.

Ceratoplax fulgida RATHBUN, Proc. U. S. N. M. 48 (1914) 146.

Near MARINDUQUE. LUZON, Tayabas Light (outer), 83 fathoms (Albatross).

CERATOPLAX TRUNCATIFRONS Rathbun.

Ceratoplax truncatifrons RATHBUN, Proc. U. S. N. M. 48 (1914) 147.

Off Western SAMAR. BADIAN, 32 fathoms (Albatross).

Genus TYPHLOCARCINUS Stimpson

TYPHLOCARCINUS CRATERIFER Rathbun.

Typhlocarcinus craterifer RATHBUN, Proc. U. S. N. M. 48 (1914) 147.

East of MASBATE. DESTACADO, 80 fathoms (Albatross).

Genus HEPHTHOPELTA Alcock

HEPHTHOPELTA APTA Rathbun.

Hephthopelta apta RATHBUN, Proc. U. S. N. M. 48 (1914) 148.

Between CEBU and BOHOL, Lauis Point Light, 175 fathoms (Albatross).

Genus CHASMOCARCINUS Rathbun

CHASMOCARCINUS CAVIMANUS Rathbun.

Chasmocarcinus cavimanus RATHBUN, Proc. U. S. N. M. 48 (1914) 149.

Tañon Strait, east coast of NEGROS. PESCADOR, 300 fathoms (Albatross).

TYPHLOCARCINOPSINÆ

Genus TYPHLOCARCINOPS Rathbun

TYPHLOCARCINOPS DECRESCENS Rathbun.

Typhlocarcinops decrescens RATHBUN, Proc. U. S. N. M. 48 (1914) 151.

Sulu Archipelago, Tawitawi Group. TINAKTA, 16 fathoms (Albatross).

TYPHLOCARCINOPS MARGINATA Rathbun.

Typhlocarcinops marginata RATHBUN, Proc. U. S. N. M. 48 (1914) 152.

Off southern PALAWAN. THIRTIETH OF JUNE, 27 fathoms (Albatross).

TYPHLOCARCINOPS ANGUSTIFRONS Rathbun.

Typhlocarcinops angustifrons RATHBUN, Proc. U. S. N. M. 48 (1914) 153.

Between MARINDUQUE and LUZON. SAN ANDREAS, 50 fathoms (Albatross).

TYPHLOCARCINOPS OCULARIA Rathbun.

Typhlocarcinops ocularia RATHBUN, Proc. U. S. N. M. 48 (1914) 153.

Between SAMAR and MASBATE. DESTACADO, Tubig Point, 135 fathoms (Albatross).

GRAPSIDÆ

GRAPSINÆ

Genus GRAPSUS Lamarck, Kingsley

GRAPSUS GRAPSUS (Linnæus).

Cancer grapsus LINNÆUS, Syst. Nat. ed. 10 1 (1758) 630.
Grapsus (Goniopsis) pictus DE HAAN, Fauna Japon. Crust. (1835) 33.
Grapsus ornatus MILNE EDWARDS, Ann. Sci. Nat. III Zool. 20 (1853) 167.
Grapsus grapsus ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 392.

MINDORO, Mindoro Province, Puerto Galera, 0–1742. LUZON, Cavite Province, San Roque, 0–1743. PALAWAN, Taytay, 0–1842.

GRAPSUS STRIGOSUS (Herbst).

Cancer strigosus HERBST, Krabben, III 1: 55, pl. 47, fig. 7.
Goniopsis strigosus DE HAAN, Fauna Japon. Crust. (1835) 33.
Grapsus strigosus MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 256; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 393.

LUZON, Ilocos Norte Province, Banua, 0043. MINDORO, Mindoro Province, Calapan, 0049.

Genus METOPOGRAPSUS Milne Edwards

METOPOGRAPSUS MESSOR (Forskål).

Cancer messor FORSKÅL, Descript. Anim. in itin. oriend. p. 88.
Grapsus messor M. EDWARDS, Hist. Nat. Crust. 2 (1837) 83.
Metopograpsus messor ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 397.

LUZON, Rizal Province, Pasay, 0–43.

METOPOGRAPSUS LATIFRONS (White).

Grapsus latifrons WHITE, Jukes' Voy. "Fly" 2 (1847) 337, pl. 2, fig. 2.
Metopograpsus latifrons H. M. EDWARDS, Ann. Sci. Nat. III 20 (1853) 253; ORTMANN, Zoöl. Jahrb. Syst. 7 (1894) 703; TESCH, Decapod. Siboga Exped. 82 (1918) 81.
Metopograpsus pictus DE MAN, Notes Leyden Mus. 1 (1879) 68.

DINAGAT, Surigao Province, 6050.

METOPOGRAPSUS MACULATUS H. M. Edwards.

Metopograpsus maculatus H. M. EDWARDS, Ann. Sci. Nat. III 20 (1853) 165; DE MAN, Journ. Linn. Soc. London 22 (1888) 145, pl. 10, figs. 1, 3.

LUZON, Bataan Province, Orani, 0051.

Genus GEOGRAPSUS Stimpson

GEOGRAPSUS LIVIDUS (Milne Edwards).

Grapsus lividus MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 85.
Geograpsus occidentalis STIMPSON, Ann. Lyc. Nat. Hist. New York 7 (1860) 230.
Geograpsus lividus RATHBUN, U. S. N. M. Bul. 97 (1916) 232, pl. 55.

Locality not indicated, 0047.

Subfamily SESARMINÆ Dana

Genus SESARMA Say

SESARMA BIDENS (de Haan).

Grapsus (*Pachysoma*) *bidens* DE HAAN, Fauna Japon. Crust. (1835) 60, pl. 16, fig. 4.
Sesarma bidens A. M. EDWARDS, Nouv. Archiv. Mus. 5 (1869); BÜRGER, Zoöl. Jahrb. Syst. 7 (1893) 628; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 415.

LUZON, Manila, from an estero, 0–203; Camarines Sur Province, Calabanga, 0061. PANAY, Capiz Province, 0060.

SESARMA TÆNIOLATA White.

Sesarma taeniolatum WHITE, List Crust. Brit. Mus. (1847) 38; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 419.
Sesarma mederi MILNE EDWARDS, Ann. Sci. Nat. Zool. (2) 20 (1853) 185.
Sesarma taeniolata BÜRGER, Zoöl. Jahrb. Syst. 7 (1893) 615.

MINDORO, Mindoro Province, Puerto Galera, 0–404. MACTAN, Cebu Province, 0072. SULU, Sulu Province, Patieul, 0076. PANAY, Iloilo Province, Dumangas, 0077. LUZON, Manila (Bürger).

SESARMA (PARASESARMA) MOLUCCENSE JAMELENSE Rathbun.

Sesarma (*Parasesarma*) *moluccense jamelense* RATHBUN, Proc. U. S. N. M. (1907) 81.

PALAWAN, Taytay, 0–1200, from brackish water.

SESARMA (SESARMA) BIDENTATUM Benedict.

Sesarma bidentata BENEDICT, Johns Hopkins Univ. Cir. 11 (1892) 77.
Sesarma (*Sesarma*) *bidentatum* RATHBUN, U. S. N. M. Bul. 97 (1916) 295, pl. 80.

SEYCHELLES, Mindoro Province, 0–1495.

SESARMA DUSSUMIERI M. Edwards.

Sesarma dussumieri M. EDWARDS, Ann. Sci. Nat. 20 (1853) 185; DE MAN, Journ. Linn. Soc. London 22 (1888) 177, pl. 12, figs. 8–12.

PANAY, Iloilo Province, La Paz, 0052.

SESARMA AUBRYI A. M. Edwards.

Sesarma aubryi A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. 5 (1869); MIERS, Proc. Zoöl. Soc. (1877) 137; DE MAN, Journ. Linn. Soc. London 22 (1888) 168.

MINDORO, Mindoro Province, Calapan, 0059.

SESARMA LIVIDA A. M. Edwards.

Sesarma livida DE MAN, Journ. Linn. Soc. London 22 (1888) 179.
Sesarma (Chiromantes) livida TESCH, Zoöl. Med. Mus. Leiden 3 (1917) 169.

MACTAN, Cebu Province, 0063.

SESARMA (SESARMA) PALAWENSE Rathbun.

Sesarma (Sesarma) palawensis TESCH, Zoöl. Med. Mus. 3 (1917) 183, pl. 16, fig. 2.

MACTAN, Cebu Province, 0067. PANAY, Iloilo Province, Barotac Nuevo, 0068.

SESARMA (SESARMA) MINDANAOENSE Rathbun.

Sesarma (Sesarma) mindanaoense RATHBUN, Proc. U. S. N. M. 47 (1915) 75.

LEYTE, Leyte Province, Cabalian, 0064. NEGROS, Negros Oriental Province, Dumaguete River, 0065. JOLO, Sulu Province, Patieul, 0066.

SESARMA (SESARMA) VICENTENSE Rathbun.

Sesarma (Sesarma) vicentense RATHBUN, Proc. U. S. N. M. 47 (1907–10).

LUZON, Port San Vicente. PALANI, off northern LUZON.

SESARMA (SESARMA) EDWARDSI PHILIPPINENSI Rathbun.

Sesarma (Sesarma) edwardsi philippinensi RATHBUN, Proc. U. S. N. M. 47 (1907–10).

BUSUANGA, Palawan Province, Pangauran River, Port Caltom.

SESARMA (SESARMA) TECTUM Rathbun.

Sesarma (Sesarma) tectum RATHBUN, Proc. U. S. N. M. 47 (1907–10).

PALANI, off Northern LUZON, Port San Vicente.

SESARMA (PARASESARMA) DUMACENSE Rathbun.

Sesarma (Parasesarma) dumacense RATHBUN, Proc. U. S. N. M. 47 (1907–10) 80.

LUZON, Dumaca River.

SESARMA (PARASESARMA) PANGAURANENSE Rathbun.

Sesarma (Parasesarma) pangauranense RATHBUN, Proc. U. S. N. M. 47 (1907–10).

BUSUANGA, Pangauran River, Port Caltom.

SESARMA TRAPEZOIDEA Guerin.

Sesarma trapezoidea DE MAN, Zoöl. Jahrb. Syst. 2 (1887) 654; Zoöl. Jahrb. Syst. 4 (1889) 426, pl. 9, fig. 7; pl. 10, fig. 8; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 719.

Philippines (Ortmann).

SESARMA MEINERTI de Man.

Sesarma tetragona MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 73; A. M. EDWARDS, Nouv. Archiv. Mus. Paris 9 (1873) 304.

Sesarma meinerti DE MAN, Zoöl. Jahrb. Syst. 2 (1887) 648; BÜRGER, Zoöl. Jahrb. Syst. 7 (1893) 617; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 721.

BOHOL (Bürger).

SESARMA EDWARDSI de Man.

Sesarma edwardsi DE MAN, Zool. Jahrb. 2 (1887) 640; Journ. Linn. Soc. London 22 (1888) 186, pl. 13, figs. 1–4; BÜRGER, Zool. Jahrb. Syst. 7 (1893) 617, var.; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 721.

Philippines (Bürger).

SESARMA SMITHI Milne Edwards.

Sesarma smithi MILNE EDWARDS, Archiv. Mus. Paris 7 (1885) 149, pl. 9, fig. 2; A. MILNE EDWARDS, Nouv. Archiv. Mus. Paris 9 (1873) 305; DE MAN, Zoöl. Jahrb. 2 (1887) 852; BÜRGER, Zoöl. Jahrb. 7 (1893) 618, pl. 21, fig. 2; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 722.

Manila (Bürger).

SESARMA IMPRESSA Milne Edwards.

Sesarma impressa MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 74; MILNE EDWARDS, Ann. Nat. Sci. (3) Zool. 20 (1853) 186; DE MAN, Zoöl. Jahrb. 2 (1887) 653, 671; BÜRGER, Zoöl. Jahrb. 7 (1893) 620, pl. 21, figs. 4, 5; ORTMANN, Decapod. Krebse Strassburger Zoöl. Jahrb. Syst. 7 (1894) 723.

Sesarma similis HESS, Decapod. Krebse Ost-Austral. (1865) 24; HASWELL, Cat. Austral. Crust. (1882) 108.

LUZON, Bataan Province, Mariveles, 2,000 ft. above sea level (Bürger). The place is probably Mariveles.

SESARMA UNGULATA Milne Edwards.

Sesarma ungulata DE MAN, Journ. Linn. Soc. 22 (1888) 168.

Philippines.

SESARMA OBLONGA de Man.

Sesarma oblonga DE MAN, Journ. Linn. Soc. 22 (1888) 189.

Philippines.

Genus METASESARMA Milne Edwards

METASESARMA ROUSSEAUXI Milne Edwards.

Sesarma aubryi DE MAN, Archiv f. Naturg. Jg. 53 1 (1887) 372; DE MAN, Zool. Jahrb. 4 (1887) 661.

Metasesarma rousseauxi DE MAN, Zool. Jahrb. 4 (1889) 439; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 717.

LUZON (Ortmann).

Genus HELICE de Haan

HELICE LATREILLEI Milne Edwards.

Cyclograpsus latreillei MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 80.

Helice latreillei MILNE EDWARDS, Ann. Sci. Nat. 18 (1852) 190; MIERS, Rept. Voy. Challenger, Brachyura 17 (1886) 268, pl. 21, fig. 2.

MINDANAO, Zamboanga Province, from a reef, 10 fathoms (Challenger).

Subfamily VARUNINÆ Alcock

Genus VARUNA Milne Edwards

VARUNA ALTIMANA Rathbun.

Varuna altimana RATHBUN, Proc. U. S. N. M. 47 (1907–10) 70.

Ptychognathus altimanus TESCH, Decapod. Brachyura, Siboga Exped. 82 (1918) 88, pl. 4, fig. 5.

MINDORO, Mindoro Province, Puerto Galera, 0–404. NEGROS, Negros Oriental Province, Dumaguete, 0074. SULU, Jolo Province, Paticul, 0076. PANAY, Iloilo Province, Dumangas, 0077. LUZON, Ilocos Sur Province; Ilocos Norte Province.

VARUNA LITTERATA (Fabricius).

Cancer litteratus FABRICIUS, Ent. Syst. Suppl. p. 342.

Varuna litterata MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 95, pl. 14, fig. 3; DANA, U. S. Explor. Exped. Crust. 13 (1852) 336, pl. 20, fig. 8; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 264; ALCOCK, Carc. Fauna. India, Journ. Asiat. Soc. Bengal 69 (1900) 401.

LUZON, Manila, 0–1369. MINDANAO, Zamboanga Province, Pasonanca.

Genus UTICA White

UTICA GRACILIPES White.

Utica gracilipes WHITE, Zoöl. Voy. Samarang, Crust. (1843–46) 53, pl. 12, fig. 6; MILNE EDWARDS, Ann. Sci. Nat. III Zoöl. 20 (1853) 177.

MINDORO, Mindoro Province, Puerto Galera, 0–1780. NEGROS, Negros Occidental Province.

Genus PTYCHOGNATHUS Stimpson

PTYCHOGNATHUS CULULUGANI Rathbun.

Ptychognathus gutjulugani RATHBUN, Proc. U. S. N. M. 47 (1907–10) 71; TESCH, Decapoda, Brachyura, Siboga Exped. 82 (1918) 93, pl. 4, fig. 6.

LUZON, Bataan Province, Mariveles, 0–1434. MINDORO, Mindoro Province, Puerto Galera, N–106. LEYTE, Leyte Province, Bombon, 0057.

PTYCHOGNATHUS JOHANNÆ Rathbun.

Ptychognathus johannæ RATHBUN, Proc. U. S. N. M. 45: 354, pl. 30.

LUZON, Bataan Province, Mariveles, 0–47. MINDORO, Mindoro Province, Puerto Galera, 0–1740.

PTYCHOGNATHUS BARBATUS (A. M. Edwards).

Gnathograpsus barbatus A. M. EDWARDS, Nouv. Archiv. Mus. 9 (1873) 316, pl. 17, fig. 4.

Ptychognathus barbatus ORTMANN, Zool. Jahrb. Syst. 7 (1894) 712; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 406.

LUZON, Batangas Province, Bombon Lake, 0054.

Subfamily PLAGUSINÆ Dana

Genus PLAGUSIA Latreille

PLAGUSA DEPRESSA (Fabricius).

Cancer depressus FABRICIUS, Syst. Entom. (1775) 406.

Grapsus depressus BOSCH, Hist. Nat. Crust. 1 (1801–02) 203.

Plagusia depressa SAY, Journ. Acad. Nat. Sci. Philad. 1 (1815) 100; RATHBUN, U. S. N. M. Bul. 97 (1918) 532, pl. 101.

LUZON, Bataan Province, Mariveles, 0–952, 0–976, 0–955; Albay Province, Legaspi; Cavite Province, Looc.

PLAGUSIA DEPRESSA var. SQUAMOSA (Herbst).

Cancer squamosa HERBST, Krabben 1 (1790) 260, pl. 20, fig. 113.

Plagusia squamosa A. M. EDWARDS, Nouv. Archiv. Mus. 9 (1873) 298.

Plagusia tuberculata MIERS, Ann. Mag. Nat. Hist. (5) 1 (1878) 148; DE MAN, Notes Leyden Mus. 5 (1883) 168.

Plagusia depressa MILNE EDWARDS, Ann. Sci. Nat. Zoöl. (3) 20 (1853) 179.

Plagusia orientalis STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 103.

Plagusia depressa var. *squamosa* ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 437.

LUZON, Bataan Province, Mariveles, 0–154.

PLAGUSIA IMMACULATA Lamarck.

Plagusia immaculata LAMARCK, Hist. Nat. Anim. sans Vert. 5 (1818) 247; HASWELL, Cat. Austral. Crust. (1882) 110; MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 273, pl. 22, fig. 1; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 730.

Philippines (Miers).

Genus PERCNON Gistel

PERCNON GIBBESI (Milne Edwards).

Acanthopus gibbesi MILNE EDWARDS, Ann. Sci. Nat. III Zool. 20 (1853) 180.

Leiolophus planissimus MIERS, Ann. Mag. Nat. Hist. V 1 (1878) 153; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 439.

Percnon planissimum RATHBUN, Proc. U. S. N. M. 22 (1900) 281.

Percnon gibbesi RATHBUN, U. S. N. M. Bul. 97 (1918) 337, pl. 105.

MINDORO, Mindoro Province, Puerto Galera, 0–1407. LUZON, Bataan Province, Mariveles; Cavite Province, Looc.

Family GEOCARCINIDÆ Dana

Genus CARDISOMA Latreille

CARDISOMA CARNIFEX (Herbst).

Cardisoma carnifex HERBST, Krabben etc. 2 (1794) 163, pl. 12, figs. 1, 2.

Cardisoma guanhumi var. *carnifex* ORTMANN, Zool. Jahrb. Syst. 7 (1893–94) 735.

Cardisoma carnifex ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 445.

NEGROS, Occidental Negros Province, 0–122. PALAWAN, Taytay, 0–1326; Balabac, 0084. DINAGAT, Surigao Province, 0083.

CARDISOMA HIRTIPES Dana.

Cardisoma hirtipes DANA, U. S. Explor. Exped. Crust. (1852) 376, pl. 24, fig. 2; MILNE EDWARDS, Ann. Soc. Nat. (3) Zool. 20 (1853) 205; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 447.

Discoplax longipes A. M. EDWARDS, Ann. Soc. Entom. France (4) 7 (1867) 284; A. M. EDWARDS, Nouv. Archiv. Mus. Paris 4 (1873) 294, pl. 15.

Locality not indicated.

Genus GECARCOIDEA Milne Edwards

GECARCOIDEA LALANDII Milne Edwards.

Gecarcoidea lalandii MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 25; RATHBUN, U. S. N. M. Bul. 97 (1918) 364, pl. 100, figs. 7, 8; TESCH, Decapoda Siboga Exped. 82 (1918) 138.

Pelocarcinus lalandii MILNE EDWARDS, Ann. Sci. Nat. III 20 (1853) 203.

Hylaxarcinus hunei WOOD-MASON, Journ. Asiat. Soc. Bengal 42 (1873) 260, pls. 15, 16.

Limnocarcinus intermedius DE MAN, Notes Leyden Mus. 1 (1879) 65.

MINDORO, Mindoro Province, Puerto Galera, 0–22.

Genus GECARCINUS Leach

GECARCINUS RURICULA (Linnæus).

Cancer terrestris cuniculus sub terra agens SLOANE, Voy. Jamaica 1 (1707), pl. 2; 2 (1725) 269.

Cancer ruricula LINNÆUS, Syst. Nat. ed. 10 1 (1758) 626; HERBST, Naturg. Krabben u. Krebse 1 (1783) 119, pl. 3, fig. 36.

Gecarcinus ruricola LEACH, Trans. Linn. Soc. London 11 (1815) 322; RATHBUN, U. S. N. M. Bul. 97 (1918) 352, pls. 117, 118.

Ocypoda rubra FREMINVILLE, Ann. Sci. Nat. II Zool. 3 (1835) 222.

MINDORO, Mindoro Province, Calapan, 0058.

Family OCYPODIDÆ Ortmann

Subfamily OCYPODINÆ Dana

Genus OCYPODE Fabricius

OCYPODE GAUDICHAUDII Milne Edwards and Lucas.

Ocypode gaudichaudii MILNE EDWARDS and LUCAS, d' Orbigny's Voy. dans l' Amer. Merrid. Crust. 6 (1843) 26; RATHBUN, U. S. N. M. Bul. 97 (1918) 373, pl. 129, fig. 1; pl. 130, fig. 1; SCHMIDT, Marine Decapod. Crust. Univ. Calif. Publ. 23 (1921) 278.

COMIRAN, Palawan Province, 0–1783. MINDORO, Mindoro Province, Puerto Galera, Mamucan. CAGAYANCILLO, Palawan Province.

OCYPODE ALBICANS Bosc.

Cancer arenarius CATESBY, Nat. Hist. Carolina 2 (1742) 35, pl. 35.
Cancer vocans LINNÆUS, Syst. Nat. ed. 10 1 (1758) 626 (part).
Cancer quadratus FABRICIUS, Mant. Ins. 1 (1787) 316.
Ocypode quadrata FABRICIUS, Ent. Syst. Suppl. (1798) 348.
Ocypode albicans BOSC, Hist. Nat. Crust. 1 and 10 (1801–2) 196; LATREILLE, Hist. Nat. Crust. 6 and 11 (1802) 48; RATHBUN, U. S. N. M. Bul. 97 (1918) 367, pls. 127, 128.

COMIRAN, Palawan Province, 0–1745. CAGAYANCILLO, Palawan Province, Mamucan.

These crabs are known as sand crabs or ghost crabs.

OCYPODE CERATOPHTHALMA (Pallas).

Cancer cursor HERBST, Krabben 1 (1790) 74, pl. 1, figs. 8, 9.
Ocypode ceratophthalma FABRICIUS, Ent. Syst. Suppl. p. 347; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 345.

LUZON, Bataan Province, Mariveles, 0–48; Bulacan Province, 0041; Albay Province, Tabaco, 0046. POLILLO, Tayabas Province, 0042. COMIRAN, Palawan Province, 0043. BANTAYAN, Cebu Province, 0044.

OCYPODE CORDIMANA Desmarest.

Ocypode cordimana MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 45; Ann. Sci. Nat. (3) Zoöl. 18 (1852) 143; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1893–94) 764, pl. 23, fig. 16.
Ocypode laevis DANA, U. S. Explor. Exped. Crust. (1852) 326, pl. 20, fig. 2.

Manila (Heller).

Genus UCA Leach

(= *Gelasimus* Latreille)

UCA ANNULIPES (Latreille).

Gelasimus cariosis M. EDWARDS, (nec. Desm.) Hist. Nat. Crust. 2 (1837) 53.
Cancer vocans minor HERBST, Krabben 1 (1790) 81, pl. 1, fig. 10.
Gelasimus annulipes MIERS, Rept. Voy. Challenger, Brachyura, Zoöl. 17 (1886) 244; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 353.

MINDORO, Mindoro Province, Calapan, 0006. MACTAN, Cebu Province. MINDANAO, Zamboanga (Challenger), 10 fathoms.

UCA TETRAGONA (Herbst).

Cancer tetragonon HERBST, Krabben 1 (1790) 257, pl. 20, fig. 110.
Gelasimus tetragonum ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 357.

NEGROS, Oriental Negros Province, Tamiso, 0033.

UCA TRIANGULARIS (A. M. Edwards).

Gelasimus perplexus HELLER, (nec. Edw.) Novara Crust. p. 38, pl. 5, fig. 4.
Uca triangularis NOBILI, Ann. Mus. Genov. (2) 20 (1899) 274.
Gelasimus triangularis ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 356.

PANAY, Capiz Province, Capiz, 0034. MACTAN, Cebu Province, 0035.

UCA DUSSUMIERI (M. Edwards).

Gelasimus longidigitum KINGSLEY, Proc. Acad. Nat. Sci. Philad. (1880) 144, pl. 9, figs. 10, 13.
Uca dussumieri ORTMANN, Zool. Jahrb. Syst. 10 (1897–98) 348.
Gelasimus dussumieri ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 361.

JOLO, Sulu Province, Sitankay, 0016. MACTAN, Cebu Province, 0017. NEGROS, Oriental Negros Province, Tamiso, 0018. BANTAYAN, Cebu Province, 0019.

UCA ACUTA (Stimpson).

Uca acuta DOFLEIN, S. B. Akad. München. 29 (1899) 193.
Gelasimus acutus ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 360.

PANAY, Iloilo Province, La Paz, 0001; Negros Oriental Province, Tinarian, 0002.

UCA ARCUATA (de Haan).

Gelasimus arcuatus MIERS, Ann. Mag. Nat. Hist. (5) 6 (1880) 309; HASWELL, Cat. Austral. Crust. (1882) 92; DE MAN, Notes Leyden Mus. 13 (1891) 28, pl. 3, fig. 7.

LUZON, Manila Bay, 0010. PANAY, Capiz Province, Capiz, 0011.

UCA COARCTATA (M. Edwards).

Gelasimus coarctatus DE MAN, Notes Leyden Mus. 13 (1891) 31, pl. 3, fig. 8; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1893–94) 756.

LUZON, Manila Bay, 0012; Rizal Province, Malabon, 0013. PANAY, Capiz Province, 0014. BANTAYAN, Cebu Province, 0015. MINDANAO (Ortmann).

UCA SIGNATA (Heller).

Gelasimus signatus HASWELL, Cat. Austral. Crust. (1882) 93; DE MAN, Zool. Jahrb. 2 (1887) 697; Notes Leyden Mus. 13 (1891) 35,

pl. 4, fig. 11; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1893–94) 756.

PANAY, Capiz Province, Capiz, 0032.

UCA FORCIPATA (de Man).

Gelasimus forcipatus DE MAN, Notes Leyden Mus. 13 (1891) 32, pl. 3, fig. 9; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1893–94) 736.

LUZON, Manila Bay, 0027. NEGROS, Oriental Negros Province, Tamiso, 0029.

UCA VOCATOR (Herbst).

Gelasimus vocator KINGSLEY, Proc. Acad. Nat. Sci. Philad. (1880) 147, pl. 10, fig. 20; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1893–94) 757.

LUZON, Manila Bay, 0036. PALAWAN, Guinto, 0037. MACTAN, Cebu Province, 0038.

UCA MARIONIS (Desmarest).

Gelasimus cultrimanus WHITE, P. Z. S. (1847) 141, pl. 9, fig. 8.
Gelasimus marionis ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 359.

LUZON, Maytubig, 0030; Rizal Province, Pasay.

UCA MARIONIS var. NITIDA (Alcock).

Gelasimus nitidus DANA, U. S. Explor. Exped. Crust. 1 (1852) 316, pl. 19, figs. 6a–d.
Gelasimus vocans M. EDWARDS, Ann. Sci. Nat. III Zool. 18 (1852) 145.
Gelasimus marionis var. *nitida* ALCOCK, Carc. Fauna, India, Journ. Asiat. Soc. Bengal 69 (1900) 360.

LUZON, Manila, Estero, 0–10; Rizal Province, Malabon, 0–96.

UCA URVILLEI M. Edwards.

Gelasimus urvillei MILNE EDWARDS, Ann. Sci. Nat. III Zool. 18 (1852) 148, pl. 3, fig. 10; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 362.

LUZON, Manila, Georgia Street, Estero, 0–231.

UCA RATHBUNAE Pearse.

Uca rathbunae PEARSE, Philip. Journ. Sci. § D 7 (1912) 91, fig. 1; TESCH, Decapoda Siboga Exped. 32 (1918) 37.

LUZON, Manila, Estero, 0–15. MINDORO, Mindoro Province, Puerto Galera, 0–1839.

UCA ZAMBOANGANA Rathbun.

Uca zamboangana RATHBUN, Proc. U. S. N. M. 44 (1913) 616, pl. 74; TESCH, Decapoda Siboga Exped. 32 (1918) 37.

MINDANAO, Zamboanga Province (Rathbun).

UCA MEARNSI Rathbun.

Uca mearnsi RATHBUN, Proc. U. S. N. M. 44 (1913) 616, pl. 75, figs. 1, 2; TESCH, Decapoda, Siboga Exped. 32 (1916) 37.

MINDANAO, Davao Province (Rathbun).

UCA RUBRIPES Jacquinot and Lucas.

Gelasimus rubripes MILNE EDWARDS, Ann. Sci. Nat. III Zool. 18 (1852) 148, pl. 4, fig. 12; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 243.

MINDANAO, Zamboanga (Challenger), 10 fathoms.

UCA LATREILLEI Milne Edwards.

Gelasimus latreillei KINGSLEY, Proc. Acad. Nat. Sci. Philad. (1880) 152, pl. 10, fig. 31; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1893–94) 757.

Philippines (Kingsley).

UCA CULTRIMANA (White).

Gelasimus cultrimanus KINGSLEY, Proc. Acad. Nat. Sci. Philad. (1880) 140, pl. 9, fig. 7; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1893–94) 753.

Gelasimus vocans MIERS, Ann. Mag. Nat. Hist. (5) 5 (1880) 308; DE MAN, Notes Leyden Mus. 2 (1880) 67; HASWELL, Cat. Austral. Crust. (1882) 92.

LUZON (Ortmann).

Subfamily MACROPHTHALMINÆ Dana

Genus MACROPHTHALMUS Latreille

MACROPHTHALMUS DEFINITUS White.

Macrophthalmus definitus ORTMANN, Zool. Jahrb. Syst. 10 (1897) 342; RATHBUN, Bul. Mus. Comp. Zool. Harvard 72 No. 16, p. 307.

LUZON, Manila, Estero, 0–545. MINDORO, Mindoro Province, Puerto Galera.

MACROPHTHALMUS CRINITUS Rathbun.

Macrophthalmus sp. DE MAN, Abh. Senckenb. naturf. Ges. 25 (1902) 495.

Macrophthalmus pacificus RATHBUN, Bul. Mus. Comp. Zool. 52 (1910) 307, pl. 1, fig. 3 [not *M. pacificus* DANA (1851); DE MAN (1890)].

Macrophthalmus crinitus RATHBUN, Proc. U. S. N. M. 44 (1913) 618.

LUZON, 0–1754, locality not indicated.

MACROPHTHALMUS SANDAKANI Rathbun.

Macrophthalmus sandakani RATHBUN, Proc. U. S. N. M. 47 (1914) 82.

These crabs inhabit muddy beaches, and are quite abundant at mouths of streams. The writer has seen them collected for food at the mouth of Mambaling River in Cebu.

MACROPHTHALMUS JAPONICUS de Haan.

Macrophthalmus japonicus DE HAAN, Fauna Japon. Crust. (1850) 54, pl. 15, fig. 2; pl. 7, fig. 1; ADAMS and WHITE, Voy. Samarang (1850) 51; MILNE EDWARDS, Ann. Sci. Nat. III Zool. 18 (1852) 158.

LUZON, Manila Bay, 0078. BANTAYAN, Cebu Province, 0080. Locality not indicated, 0–1749.

MACROPHTHALMUS LATREILLEI (Desmarest).

Macrophthalmus latreillei MILNE EDWARDS, Hist. Nat. Crust. 2 (1837) 66; A. M. EDWARDS, Nouv. Archiv. Mus. Paris 9 (1873) 278; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1893–94) 747.

Macrophthalmus serratus ADAMS and WHITE, Zool. Voy. Samarang (1850) 51; MILNE EDWARDS, Ann. Sci. Nat. (3) Zool. 18 (1852) 159; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 250, pl. 20, fig. 1.

Philippines (Miers); LUZON (Ortmann).

SCOPIMERINÆ

Genus TYMPANOMERUS Rathbun

(=*Dioxippe* de Man)

TYMPANOMERUS PHILIPPINENSIS Rathbun.

Tympanomerus philippinensis RATHBUN, Proc. U. S. N. M. 47 (1914) 84; TESCH, Decapoda, Siboga Exped. 82 (1916) 49.

NEGROS, Negros Province, Guijulngan (Rathbun).

PINNOTHERIDÆ

PINNOTHERINÆ

Genus PINNOTHERES Latreille

PINNOTHERES AFFINIS Bürger.

Pinnotheres affinis BÜRGER, Zool. Jahrb. Syst. 8 (1895) 365, pl. 9, fig. 2; pl. 10, figs. 2, 3.

BOHOL, 4 females and 7 males.

PINNOTHERES GLABERRIMUS Bürger.

Pinnotheres glaberrimus BÜRGER, Beitrag z. Kenntnis d. Pinnotherien Zool. Jahrb. Syst. 8 (1895) 366, pl. 9, fig. 3; pl. 10, fig. 3.

MINDANAO, Zamboanga Province, taken from the shell of *Arca* collected from the brackish water.

PINNOTHERES CARDII Bürger.

Pinnotheres cardii BÜRGER, Zool. Jahrb. Syst. 8 (1895) 367, pl. 9, fig. 4; pl. 10, fig. 4.

BURIAS, one ovigerous female taken from the shell of *Cardium unedo*.

PINNOTHERES COARCTATUS Bürger.

Pinnotheres coarctatus BÜRGER, Zool. Jahrb. Syst. 8 (1895) 369, pl. 9, fig. 7; pl. 10, fig. 7.

Zamboanga Province, from the shell of Cahobe collected from brackish water.

PINNOTHERES MODIOLICOLA Bürger.

Pinnotheres modiolicola BÜRGER, Zool. Jahrb. Syst. 8 (1895) 370.

Philippines, one female from the shell of *Modiola philippinarum*.

PINNOTHERES PALAENSIS Bürger.

Pinnotheres palaensis BÜRGER, Beitrag z. Kenntnis d. Pinnotherien, Zool. Jahrb. Syst. 8 (1895) 372, pl. 9, fig. 12; pl. 10, fig. 12.

BURIAS, 2 males and 2 females, taken from the shell of *Byssoarca* sp.

PINNOTHERES LATISSIMUS Bürger.

Pinnotheres latissimus BÜRGER, Zool. Jahrb. Syst. 8 (1895) 373, pl. 9, fig. 13; pl. 10, fig. 13.

Manila.

PINNOTHERES LATUS Bürger.

Pinnotheres latus BÜRGER, Zool. Jahrb. Syst. 8 (1895) 374, pl. 9, fig. 16; pl. 10, fig. 15.

BURIAS, 4 females, taken from the shell of *Pinna* sp.

PINNOTHERES PARVULUS Stimpson.

Pinnotheres parvulus STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 108; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 376, pl. 9, fig. 18; pl. 10, fig. 17.

BURIAS, 2 females, taken from the shell of *Mytilus* (Bürger).

PINNOTHERES EXIGUUS Bürger.

Pinnotheres exiguus BÜRGER, Zool. Jahrb. Syst. 8 (1895) 377, pl. 9, fig. 19; pl. 10, fig. 30.

SAMAR, 4 females, 3 of which were ovigerous.

PINNOTHERES ROTUNDATUS Bürger.

Pinnotheres rotundatus BÜRGER, Beitrag z. Kenntnis d. Pinnotherien Zool. Jahrb. Syst. 8 (1895) 378, pl. 9, fig. 21; pl. 10, fig. 19.

BURIAS, from the shell of *Circe*.

PINNOTHERES HOLOTHURIÆ Semper.

Pinnotheres holothuriæ C. SEMPER, Die natürlichen Existenzbedingungen der Thiere, Leipzig 1 (1880) 78, 99; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 381, pl. 9, fig. 27; pl. 10, figs. 26, 36.

MINDANAO, Zamboanga Province, "Parasit in der Lunge von Stichopus variegatus, in der noch eine der mir vorliegenden Individuen eingeschlossen ist" Bürger.

PINNOTHERES FLAVUS Nauck.

Pinnotheres flavus NAUCK, Das Kaugerüst der Brachyuren, Z. Wiss. Zool. 34 (1880) 68; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 383, pl. 9, fig. 29; pl. 10, figs. 29, 35.

MINDANAO, Zamboanga Province (Bürger).

Genus XANTHASIA White

XANTHASIA MURIGERA White.

Xanthasia murigera WHITE, Ann. Mag. Nat. Hist. 18 (1846) 176, pl. 2, fig. 3; DANA, U. S. Explor. Exped. Crust. 13 (1852) 384, pl. 24, fig. 6; BÜRGER, Zool. Jahrb. Syst. 8 (1895) 386, pl. 10, fig. 36.

BURIAS, 2 males and 1 female, taken from *Tridacna* (Bürger).

XENOPHTHALMINÆ

Genus XENOPHTHALMUS White

XENOPHTHALMUS PINNOTHEROIDES White.

Xenophthalmus pinnotheroides WHITE, Ann. Mag. Nat. Hist. 18 (1846) 178, pl. 2, fig. 2; ADAMS and WHITE, Zool. Voy. Samarang, Crust. (1850) 63, pl. 12, fig. 2; MILNE EDWARDS, Ann. Nat. Sci. III Zool. 20 (1853) 221; STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 107.

MINDORO, Mindoro Province, Puerto Galera, 0–1752.

XENOPHTHALMUS LATIFRONS Bürger.

Xenophthalmus latifrons BÜRGER, Beitrag z. Kenntnis d. Pinnotherien, Zool. Jahrb. Syst. 8 (1895) 387, pl. 9, fig. 32; pl. 10, fig. 32.

LUZON, Bataan Province, Marivoles. BOHOL. Bürger's collection consisted of 6 ovigerous females.

Family MICTYRIDÆ Dana

Genus MICTYRIS Latreille

MICTYRIS LONGICARPUS Latreille.

Mictyris longicarpus LATREILLE, Gen. Crust. et Ins. 1 (1806) 41; HENDERSON, Trans. Linn. Soc. London Zool. (2) 5 (1893) 390; ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 384.

Mictyris brevidactylus STIMPSON, Proc. Acad. Nat. Sci. Philad. (1858) 99, var.

BANTAYAN, Cebu Province, 0–267. BANARAN, Sulu, 0087. PALAWAN, Iwahig, 0–33.

MICTYRIS PLATYCHELES Milne Edwards.

Mictyris platycheles MILNE EDWARDS, Ann. Sci. Nat. (3) Zool. 18 (1852) 154; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 279.

Mictyris subverrucatus WHITE, List. Crust. Brit. Mus. (1847) 34, Descript. nulla.

PALAWAN, Tuytay, 0–1243.

MICTYRIS DEFLEXIFRONS de Haan.

Mictyris deflexifrons W. DE HAAN, in v. Siebold, Fauna Japon. Crust. (1835) 25.

CUYO, Palawan Province, 0086.

Family PALICIDÆ Rathbun

Genus PALICUS Philippi

PALICUS JUKESII (White).

Cymnopolia jukesii WHITE, in Jukes' Voy. H. M. S. "Fly" p. 338, pl. 2, fig. 2; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 325.

Palicus jukesii ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 69 (1900) 451.

POLILLO, Tayabas Province, 0205. The Challenger specimen was taken from a depth of 10 fathoms, south of Mindanao in 6° 54′ 0″ north latitude, 122° 18′ 0″ east longitude.

These crabs are small, having a *Dorippe* appearance. They are found among corals and resemble an eroded flake of coral rock.

The genus *Cymonomia* was formerly placed under Dorippidæ.

Tribe OXYRHYNCHA or MAIOIDEA

Legion MARINEA [23]

INACHIDÆ

LEPTSPODINÆ

Genus ACHÆUS Leach

ACHÆUS VILLOSUS Rathbun.

Achæus villosus Rathbun, Proc. U. S. N. M. 50 (1916) 528.

Off JOLO, Jolo Light, 20 fathoms (Albatross).

INACHINÆ

(=Eurypodiidæ Stimpson)

Genus CAMPOSCIA Latreille

CAMPOSCIA RETUSA Latreille.

Camposcia retusa ADAMS and WHITE, Zool. Voy. Samarang (1850) 6; A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 8 (1872) 256; HASWELL, Cat. Austral. Crust. (1882) 4; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 35.

GUIMARAS (Samarang).

Genus ONCINOPUS de Haan

ONCINOPUS NEPTUNUS Adams and White.

Oncinopus neptunus ADAMS and WHITE, Zool. Voy. Samarang (1850) 1, pl. 2, fig. 1.

Philippines (Samarang).

ONCINOPUS ARANEA de Haan.

Oncinopus aranea DE HAAN, Fauna Japon. (1850) 100, pl. 20, fig. 2; ADAMS and WHITE, Zool. Voy. Samarang (1850) 3.

East of MINDORO, 15 fathoms (Samarang).

Genus INACHUS Fabricius

INACHUS LORINA Adams and White.

Inachus lorina ADAMS and WHITE, Zool. Voy. Samarang, Crust. (1843) 3; A. WHITE, List Crust. Coll. Brit. Mus. (1847) 123.

Eastern shore of MINDANAO (Samarang).

[23] Miers (in Classification of the Maioid Crabs, Journ. Linn. Soc. Zool. 14 : 634–672) distinguished among the Malinea three principal groups, founded upon the orbital and antennal characters:—(1) Inachidæ, (2) Mailidæ, and (3) Pericerida.

Genus ECHINOPLAX Miers

ECHINOPLAX NOSELEYI Miers.

Echinoplax noseleyi MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 32, pl. 4, fig. 2.

Dredged at 9° 26′ 0″ north latitude, 123° 45′ 0″ east longitude, 375 fathoms (Challenger).

Genus ANAMATHIA Smith

(=*Amathia* Roux)

ANAMATHIA PULCHRA Miers.

Anamathia pulchra MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 26, pl. 4, fig. 1.

Dredged at 9° 26′ 0″ north latitude, 123° 45′ 0″ east longitude, 375 fathoms.

Genus PLATYMAIA Miers

PLATYMAIA BARTSCHI Rathbun.

Platymaia bartschi RATHBUN, Proc. U. S. N. M. 50 (1916) 529.

China Sea, off Southern LUZON, Matocot Point, 198 fathoms (Albatross).

PLATYMAIA REMIFERA Rathbun.

Platymaia remifera RATHBUN, Proc. U. S. N. M. 50 (1916) 530.

Between CEBU and BOHOL, Lauis Point, 175 fathoms (Albatross).

Genus CYRTOMAIA Miers

CYRTOMAIA HORRIDA Rathbun.

Cyrtomaia horrida RATHBUN, Proc. U. S. N. M. 50 (1916) 532.

APO, between NEGROS and SIQUIJOR, 256 fathoms (Albatross).

CYRTOMAIA ECHINATA Rathbun.

Cyrtomaia echinata RATHBUN, Proc. U. S. N. M. 50 (1916) 538.

PANAON, Between LEYTE and MINDANAO, San Ricardo Point, 732 fathoms.

Genus ACHAEOPSIS Stimpson

ACHAEOPSIS SULUENSIS Rathbun.

Achaeopsis suluensis RATHBUN, Proc. U. S. N. M. 50 (1916) 535.

TINAKTA, Tawitawi Group, Sulu Archipelago, 10 fathoms (Albatross).

ACANTHONYCHINÆ

Genus OXYPLEURODON Miers

OXYPLEURODON STIMPSONI Miers.

Oxypleurodon stimpsoni MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 33, pl. 6, fig. 1; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 43.

Dredged at 9° 26′ 0″ north latitude, 123° 45′ 0″ east longitude, 375 fathoms, blue mud bottom (Challenger).

Genus MENÆTHIUS M. Edwards

MENÆTHIUS MONOCEROS (Latreille).

Inachus arabicus RUPPELL, Krabben Roth. Meer. (1830) 24, pl. 5, fig. 4.
Menæthius monoceros MILNE EDWARDS, Hist. Nat. Crust. 1 (1834) 330; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 41.
Menæthius porcellus WHITE, Ann. Mag. Nat. Hist. (2) 2 (1848) 284.
Menæthius subserratus ADAMS and WHITE, Zool. Voy. Samarang (1850) 18, pl. 4, fig. 1.
Menæthius angustus, depressus, subserratus, areolatus, ornatus DANA, U. S. Explor. Exped. (1852) 120–125, pl. 4, figs. 5–7; pl. 5, figs. 2, 3.
Menæthius dentatus STIMPSON, Proc. Acad. Nat. Sci. Philad. (1857) 219.

Sulu Sea (Dana); Adams and White did not specify the locality.

Genus PELTINIA Dana[*]

PELTINIA SUBLIMIS Rathbun.

Peltinia sublimis RATHBUN, Proc. U. S. N. M. 50 (1916) 536.
Near JOLO, Jolo Light, 22 fathoms (Albatross).

The genus *Peltinia* is considered as synonym to *Pugettia* Dana by Miers in Classification of the Maioid Crustacea.

Genus HUENIA de Haan

HUENIA PROTEUS de Haan.

Huenia proteus DE HAAN, Crust. v. Siebold, Fauna Japon. dec. 4, p. 95, pl. 23, figs. 4, 5; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 35; Crust. Rept. Zool. Coll. of H. M. S. "Alert" (1894) 191; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 40.

MINDANAO. Eastern MINDORO (Samarang).

Genus PUGETTIA Dana

PUGETTIA MINDANAOENSIS Rathbun.

Pugettia mindanaoensis RATHBUN, Proc. U. S. N. M. 50 (1916) 538.

Off northern MINDANAO, Tagolo Light, 162 fathoms (Albatross).

PUGETTIA LEYTENSIS Rathbun.

Pugettia leytensis RATHBUN, Proc. U. S. N. M. 50 (1916) 539.

CAPITANCILLO, between LEYTE and CEBU, 182 fathoms (Albatross).

[*] Journ. Linn. Soc. Zool. 14: 650.

PISINÆ

Genus SPHENOCARCINUS A. M. Edwards [1]

SPHENOCARCINUS LUZONICUS Rathbun.

Sphenocarcinus luzonicus RATHBUN, Proc. U. S. N. M. 50 (1916) 540.

BATAC, Atalaya Point, east coast of Luzon, 308 fathoms (Albatross).

SPHENOCARCINUS AURITUS Rathbun.

Sphenocarcinus auritus RATHBUN, Proc. U. S. N. M. 50 (1916) 540.

BATAC, Atalaya Point, east coast of Luzon, 308 fathoms (Albatross).

SPHENOCARCINUS NODOSUS Rathbun.

Sphenocarcinus nodosus RATHBUN, Proc. U. S. N. M. 50 (1916) 541.

APO, between NEGROS and SIQUIJOR, 279 fathoms (Albatross).

MICRORHYNCHINÆ

Genus DOCLEA Leach

DOCLEA CALCITRAPA White.

Doclea calcitrapa A. WHITE, Zool. Soc. London 15 (1847) 56; WHITE, "Samarang" Crust. (1848) 7.

LUZON, Manila Bay, 0186. CEBU (Samarang).

Family MAIIDÆ Miers

Subfamily MAIINÆ Miers

Genus HYASTENUS White [2]
(= *Chorilia* Dana)

HYASTENUS TRISPINOSUS Rathbun.

Hyastenus trispinosus RATHBUN, Proc. U. S. N. M. 50 (1916) 542.

TINAKTA, Sulu Archipelago, Tawitawi Group, 10 fathoms (Albatross).

HYASTENUS ACUTUS Rathbun.

Hyastenus acutus RATHBUN, Proc. U. S. N. M. 50 (1916) 543.

Near SIASI, Sulu Archipelago, SIBUM, 17 fathoms (Albatross).

HYASTENUS TUBERCULOSUS Rathbun.

Hyastenus tuberculosus RATHBUN, Proc. U. S. N. M. 50 (1916) 543.

Near JOLO, Jolo Light, 29 fathoms (Albatross).

[1] The Genus *Sphenocarcinus* is placed by Miers (Journ. Linn. Soc. 14: 662) under subfamily Pericerinæ of the Family Periceridæ. The classification followed here is that of Rathbun.

[2] Rathbun (in Proc. U. S. N. M. 50) placed the genera *Hyastenus*, *Chorilia*, and *Naxioides* under Subfamily Pisinæ under Family Inachidæ. She also included in this family the Subfamily Schizophrysinæ and hence the genera *Maja* and *Leptomithrax*. All of these genera were placed by Miers in the Family Maiidæ. Journ. Linn. Soc. Zool. 14.

HYASTENUS ORBIS Rathbun.

Hyastenus orbis RATHBUN, Proc. U. S. N. M. 50 (1916) 544.

OBSERVATION, Tawitawi Group, Sulu Archipelago, 9 fathoms (Albatross).

HYASTENUS BIFORMIS Rathbun.

Hyastenus biformis RATHBUN, Proc. U. S. N. M. 50 (1916) 545.

TINAKTA, Tawitawi Group, Sulu Archipelago, 10 fathoms (Albatross).

HYATENUS FRATERCULUS Rathbun.

Hyastenus fraterculus RATHBUN, Proc. U. S. N. M. 50 (1916) 546.

OBSERVATION, Tawitawi Group, Sulu Archipelago, 9 fathoms (Albatross).

HYASTENUS SCROBICULATUS Rathbun.

Hyastenus scrobiculatus RATHBUN, Proc. U. S. N. M. 50 (1916) 547.

TINAKTA, Tawitawi Group, Sulu Archipelago, 12 fathoms (Albatross).

HYASTENUS TINAKTENSIS Rathbun.

Hyastenus tinaktensis RATHBUN, Proc. U. S. N. M. 50 (1916) 547.

TINAKTA, Tawitawi Group, Sulu Archipelago, 10 fathoms (Albatross).

HYASTENUS DIACANTHUS (de Haan).

Naxia diacantha DE HAAN, v. Siebold, Crust. Fauna Japon. (1839) 96, pl. 21, fig. 1.

Pisa (Naxia) diacantha DE HAAN, Fauna Japon. (1850) 96, pl. 24, fig. 1.

Hyastenus diacanthus A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. 8 (1872) 250; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 55.

Dredged at 11° 37' 0" north latitude, 123° 31' 0" east longitude, 18 fathoms, blue mud bottom (Challenger).

HYASTENUS ORYX A. M. Edwards.

Hyastenus oryx A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. 8 (1872) 250, pl. 14, fig. 1; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 68.

Dredged together with *H. diacanthus*.

HYASTENUS SEBÆ White.

Hyastenus sebæ ADAMS and WHITE, Zool. Voy. Samarang (1850).

Philippines (Samarang).

HYASTENUS ELEGANS Miers.

Hyastenus elegans MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 58, pl. 6, fig. 3.

MINDORO, Mindoro Province, Puerto Galera, 0–565. LUZON, Albay Province, 0–1473.

Genus CHORILIA Dana[37]

CHORILIA SPHENOCARCINOIDES Rathbun.

Chorilia sphenocarcinoides RATHBUN, Proc. U. S. N. M. 50 (1916) 543.

[37] Journ. Linn. Soc. Zool. 14.

APO, between NEGROS and SIQUIJOR, 279 fathoms (Albatross).

Miers[*] recognized *Chorilia* as a subgenus under *Hyastenus*.

Genus NAXIOIDES A. M. Edwards

NAXIOIDES ROMBLONI Rathbun.

Naxioides romblonii RATHBUN, Proc. U. S. N. M. 50 (1916) 549.

Near ROMBLON, Romblon Light, 37 fathoms, hard sand bottom (Albatross).

Genus PHALANGIPUS

PHALANGIPUS FILIFORMIS Rathbun.

Phalangipus filiformis RATHBUN, Proc. U. S. N. M. 50 (1916) 551.

East of LEYTE, Tacbue Point, 57 fathoms (Albatross).

PHALANGIPUS RETUSUS Rathbun.

Phalangipus retusus RATHBUN, Proc. U. S. N. M. 50 (1916) 552.

TINAKTA, Tawitawi Group, Sulu Archipelago, 18 fathoms, fine sand bottom (Albatross).

Genus PISA Leach

PISA SINOPE Adams and White.

Pisa sinope ADAMS and WHITE, Zool. Samarang, Crust. (1848) 8.

Philippines (Samarang).

Genus EGERIA Leach

(= *Leptopus* Lamarck)

EGERIA ARACHNOIDES (Rumphius).

Cancer arachnoides RUMPHIUS, D' Amboinische Rariteitkamer (1741) pl. 8, fig. 4.

Egeria indica LEACH, Zool. Miscell. 2 (1815), pl. 73.

Egeria arachnoides MILNE EDWARDS, Hist. Nat. Crust. 1 (1834) 291; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 44.

Dredged at 6° 54′ 0″ north latitude, 122° 18′ 0″ east longitude, 10 fathoms (Challenger).

EGERIA LONGIPES (=E. Herbstii) M. Edwards.

CEBU (Samarang). Rathbun believed this is identical with *Phalangipus retusus*, the new species she created in Proc. U. S. N. M. 50 : 532.

Genus NAXIA M. Edwards

(= *Naxioides* A. M. Edwards; *Podopisa* Hilgendorf)

NAXIA HIRTA (A. M. Edwards).

? *Naxioides hirta* A. M. EDWARDS, Ann. Soc. Entom. France III 5 (1865) 143, pl. 4, figs. 1.

Naxia hirta MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 61.

MINDANAO, Zamboanga Province, 15 fathoms (Challenger).

[*] Journ. Linn. Soc. 14.

Subfamily MICIPPINÆ Miers

Genus MICIPPA Leach

MICIPPA PHILYRA (Herbst).

Micippa philyra M. EDWARDS, Hist. Nat. Crust. 1 (1834) 330; ADAMS and WHITE, Zool. Voy. Samarang (1850) 16; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 59.

Micippa hirtipes DANA, U. S. Exptor. Exped. Crust. (1852) 90, pl. 1, fig. 4.

GUIMARAS (Samarang).

MICIPPA BICARINATA Adams and White.

Micippa bicarinata ADAMS and WHITE, Zool. Voy. Samarang (1850) 16.

CEBU. LUZON (Samarang). Ortmann believed this species to be identical with *M. philyra*.

MICIPPA CRISTATA (Linnæus).

Micippa cristata MILNE EDWARDS, Hist. Nat. Crust. 1 (1834) 330; ADAMS and WHITE, Zool. Voy. Samarang (1850) 16; MIERS, Ann. Mag. Nat. Hist. (5) 15 (1885) 4; ORTMANN, Decapod. Krebse Strassburger Mus. Zoöl. Jahrb. Syst. 7 (1894) 59.

LUZON, Albay Province, Magallanes, 0189. SIQUIJOR. CEBU.

Subfamily SCHIZOPHRYSINÆ Miers*

Genus MAJA Bosc

MAJA SULUENSIS Rathbun.

Maja suluensis RATHBUN, Proc. U. S. N. M. 50 (1916) 552.

Tawitawi Group, Sulu Archipelago. OBSERVATION, 9 fathoms (Albatross).

MAJA LINAPACANENSIS Rathbun.

Maja linapacanensis RATHBUN, Proc. U. S. N. M. 50 (1916) 553.

OBSERVATORY, Linapacan Strait, 46 fathoms (Albatross).

MAJA BISARMATA Rathbun.

Maja bisarmata RATHBUN, Proc. U. S. N. M. 50 (1916) 554.

Off northern MINDANAO, Point Tagolo Light, 182 fathoms (Albatross).

Genus LEPTOMITHRAX Miers*

LEPTOMITHRAX SINENSIS Rathbun.

Leptomithrax sinensis RATHBUN, Proc. U. S. N. M. 50 (1916) 555.

China Sea near southern LUZON, 88 fathoms. Miers considers this a subgenus of *Paramithrax*.

* Rathbun placed the Subfamily Schizophrysinæ in the Family Inachidæ and subsequently transferred the genera of this Subfamily from Maiidæ to the Family Inachidæ. Miers's classification is followed in this paper.

* Journ. Linn. Soc. Zool. 14.

Genus SCHIZOPHRYS White

(= *Dione* de Haan, nom. praeocc.)

SCHIZOPHRYS SPINIGER Adams and White.

Schizophrys spinigera ADAMS and WHITE, Zool. Voy. Samarang (1850).

SIQUIJOR. BOHOL (Samarang).

Genus PARAMITHRAX M. Edwards

PARAMITHRAX EDWARDSII de Haan.

Paramithrax edwardsii ADAMS and WHITE, Zool. Voy. Samarang (1850).

Philippines (Samarang).

Family PERICERIDÆ Miers

Subfamily PERICERINÆ Stimpson

Genus PERICERA Latreille

PERICERA TIARATA Adams and White.

Pericera tiarata ADAMS and WHITE, Zool. Voy. Samarang Crust. (1848) 17.

Philippines (Samarang).

PERICERA SETIGERA Adams and White.

Pericera setigera ADAMS and WHITE, Zool. Voy. Samarang Crust. (1848) 17.

Philippines (Samarang).

PERICERA CORNIGERA H. M. Edwards.

Pericera cornigera H. M. EDWARDS, Roret's Suite a Buffon Crustaces 1 (1834).

Genus TIARINIA Dana

TIARINIA GRACILIS Dana.

Tiarinia gracilis DANA, U. S. Explor. Exped. Crust. (1852) 111, pl. 3, fig. 6; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1891) 62.

Sulu Sea (Dana). Ortmann believed this species to be identical with *Pericera tiarata* of Adams and White.

Subfamily MITHRACINÆ Stimpson

Genus MITHRAX Leach

MITHRAX DICHOTOMUS Latreille.

Mithrax dichotomus A. G. DESMAREST, Consid. gen. Crust. (1825) 150.

MINDORO, Mindoro Province, Calapan, 0190.

Legion PARTHENOPINEA Dana

PARTHENOPIDÆ [31]

PARTHENOPINÆ

Genus PARTHENOPE Fabricius

PARTHENOPE (LAMBRUS) VALIDA v. Siebold.

Parthenope (Lambrus) validus v. SIEBOLD, Fauna Japon. Crust. (1839) 90, pl. 21, fig. 1; pl. 22, fig. 1.

From the shores of Mindoro, Ilocos Sur, LUZON. Sandy bottom.

PARTHENOPE (RHINOLAMBRUS) RUDIS Rathbun.

Parthenope (Rhinolambrus) rudis RATHBUN, Proc. U. S. N. M. 50 (1916) 556.

OBSERVATION, Tawitawi Group, Sulu Archipelago, 9 fathoms (Albatross).

PARTHENOPE (PSEUDOLAMBRUS) PARVA Rathbun.

Parthenope (Pseudolambrus) parva RATHBUN, Proc. U. S. N. M. 50 (1916) 557.

TINAKTA, Tawitawi Group, Sulu Archipelago, 10 fathoms (Albatross).

Genus CRYPTOPODIA Milne Edwards

CRYPTOPODIA DORSALIS Adams and White.

Cryptopodia dorsalis A. WHITE, List Crust. Coll. Brit. Mus. (1847) 125; WHITE and ADAMS, Proc. Zool. Soc. London 15 (1847) 125; Zool. Voy. Samarang, Crust. (1848) 30.

JOLO, Sulu Sea, 20 fathoms, stony bottom (Samarang).

Genus DALDORFIA Linnæus

DALDORFIA HORRIDA (Linnæus).

Cancer horridus LINNÆUS, Nat. 11, 1047, 43.
Parthenope horrida ALCOCK, Carc. Fauna India, Journ. Asiat. Soc. Bengal 63–64 (1894–95) 279.
Daldorfia horrida RATHBUN, Brachyura and Macrura of Hawaiian Islands, Bul. Fish Comm., p. 886, pl. 14, fig. 9.

CEBU, Cebu Province, Sibonga, 0–1773. MINDORO, Mindoro Province, Calapan, 0191.

Genus LAMBRUS Leach

LAMBRUS INTERMEDIUS Miers.

Lambrus intermedius MIERS, Proc. Zool. Soc. London (1879) 30; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 96, pl. 10, fig. 4.

MINDORO, Mindoro Province, Puerto Galera, 0–191.

[31] Miers (in Classification of the Maioid Crust. Journ. Linn. Soc. 14) subdivided the Family Parthenopidæ into two subfamilies: (1) Parthenopinæ, (2) Eumedoninæ.

LAMBRUS TURRIGER White.

Lambrus turriger WHITE, Proc. Zool. Soc. London (1847) 58; ADAMS and WHITE, Crust. Samarang (1848) 26, pl. 5, fig. 2; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 96.

Philippines (Samarang).

LAMBRUS PISOIDES Adams and White.

Lambrus pisoides MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 93.

Philippines (Samarang).

LAMBRUS SERRATUS M. Edwards.

Lambrus serratus M. EDWARDS, Hist. Nat. Crust. 1 (1834) 357; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 97.

CORREGIDOR (Samarang).

LAMBRUS CONTRARIUS (Herbst).

Cancer contrarius HERBST, Naturgesch. Krabben u. Krebse Heft 4 4 (1804) 8, pl. 60, fig. 3.

Lambrus contrarius M. EDWARDS, Hist. Nat. Crust. 1 (1834) 354; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 94.

MINDANAO, Zamboanga Province, 10 fathoms (Challenger).

LAMBRUS LAMELLIFRONS Adams and White.

Lambrus lamellifrons ADAMS and WHITE, Zool. Voy. Samarang, Crust. (1848) 26.

Philippines (Samarang).

LAMBRUS (PARTHENOLAMBRUS) CALAPPOIDES (Adams and White).

Parthenope calappoides ADAMS and WHITE, Crust. Zool. Samarang (1848) 34, pl. 5, fig. 5; MIERS, Crust. Rept. Zool. Coll. H. M. S. Alert (1884) 527.

Lambrus (Parthenolambrus) calappoides MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 101.

Philippines (Challenger).

LAMBRUS LONGIMANUS (Linnæus).

Lambrus longimanus LEACH, Trans. Linn. Soc. London 11 (1815) 310; MILNE EDWARDS, Hist. Nat. Crust. 1 (1834) 354; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 95.

Philippines (Samarang).

LAMBRUS PELAGICUS Ruppell.

Lambrus pelagicus RUPPELL, 24 Krabben Roth. Meer. (1830) 15, pl. 4, fig. 1; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 414.

Lambrus affinis A. M. EDWARDS, Nouv. Archiv. Mus. Hist. Nat. Paris 8 (1872) 261, pl. 14, fig. 4; HASWELL, Cat. Austral. Crust. (1882) 84.

CEBU (Thallwitz).

Family EUMEDOMIDÆ Ortmann

Subfamily EUMEDOMINÆ Miers

Genus ZEBRIDA White

ZEBRIDA ADAMSI White.

Zebrida adamsi WHITE, Proc. Zool. Soc. London (1847) 121; ADAMS and WHITE, Zool. Voy. Samarang (1850) 24, pl. 7, fig. 1; ORTMANN, Decapod. Krebse Strassburger Mus. Zool. Jahrb. Syst. 7 (1894) 419.

Sulu Sea (Ortmann).

Genus CERATOCARCINUS Adams and White

CERATOCARCINUS LONGIMANUS Adams and White.

Ceratocarcinus longimanus ADAMS and WHITE, Proc. Zool. Soc. London (1847) 57; Crust. Zool. Voy. Samarang (1848) 34, pl. 6, fig. 6; MIERS, Rept. Voy. Challenger, Brachyura, Zool. 17 (1886) 105; H. A. ROXAS, Puerto Galera, Marine Biol. Lab. Rept. (1930) 18.

MINDORO, Mindoro Province, Puerto Galera. The specimen is no longer extant.

Genus HARROVIA Adams and White*

HARROVIA ALBO-LINEATA Adams and White.

Harrovia albo-lineata Adams and White, Zool. Voy. Samarang, Crust. (1849) 56.

Philippines (Samarang).

*This genus was wrongly placed by Adams and White with the Leucosidae. By Stimpson, it was considered synonymous with Ceratocarcinus; but it is as distinct as any other group.—MIERS, Classification of the Maioid Crust. Journ. Linn. Soc. Zool. 14.

BOOKS

Acknowledgment of all books received by the Philippine Journal of Science will be made in this column, from which a selection will be made for review.

RECEIVED

ALTMAN, L. C. Oligochaeta of Washington. (Publications in biology, v. 4, no. 1.) Seattle, University of Washington, 1936. 137 pp., plates. Price, paper, $0.75.

American institute of mining and metallurgical engineers. Petroleum division. Petroleum development and technology, 1936. (Transactions of the American Institute of mining and metallurgical engineers, v. 118.) New York, The Institute, 1936. 636 pp., illus. tables. diagrs. Price, $5.

BEAUMONT, WILLIAM. Infra-red irradiation. London, H. K. Lewis & Co., 1936. 139 pp., illus. Price, 6s. 6d.

California medical association. Cancer commission. Committee studies. San Francisco, California, J. W. Stacey, 1936. 123 pp., tables.

The Chemists' year book, 1936. Manchester, Sherratt & Hughes, 1936. 1,257 pp., tables. Price, 21s.

CLARKE, G. R. The study of the soil in the field. Oxford, Clarendon press, 1936. 142 pp., tables, diagrs. Price, 5s.

CRAIGS, ELIZABETH. Economical cookery; containing over 650 economical recipes, especially selected for making the most of inexpensive foods. London and Glasgow, Collins, 1934. 252 pp. Price, 1s.

FARQUHARSON, W. I. Topography with an appendix on magnetic observations. British museum (Natural history) Scientific reports, v. 1, no. 2. John Murray expedition, 1933–34. London, The British museum, 1936. 19 pp., plates, charts. Price, 7s. 6d.

FARRAN, G. P. Copepoda. British museum (Natural history) Scientific reports, v. 4, no. 3. Great Barrier reef expedition, 1928–29. London, The British museum, 1936. 70 pp., illus., figs. Price, 5s.

FAWCETT, WILLIAM. Flora of Jamaica; containing descriptions of the flowering plants known from the island, by William Fawcett and Alfred B. Rendle. Vol. VII. Dicotyledons families Rubiaceae to Compositae, by the late Spencer Le Marchant Moore and A. B. Rendle. London, The Trustees of the British museum, 1936. 303 pp., illus. Price, 16s.

FERGUSON, R. W. Training in industry; a report embodying the results of inquiries conducted between 1931 and 1934 by the Association for education in industry and commerce. London, Pitman & sons, 1935. 156 pp. Price, 6s.

GARDNER, G. B. Keris and other Malay weapons. Singapore, Progressive pub. co., 1936. 138 pp., illus. Price, 6s. 6d.

GATES, B. A. R. Aids to the identification of anopheline imagines in Malaya. Singapore, Govt. print. off., 1935. 242 pp., illus., plates. Price, paper, $1.

GESCHICKTER, C. F., and M. M. COPELAND. Tumors of bone (including the jaws and joints). rev. ed. New York city, The American Journal of Cancer, 1936. 882 pp., illus., tables, chart. Price, $6.

GLENNIE, E. A. A report on the values of gravity in the Maldive and Laccadive Islands. British museum (Natural history) Scientific reports, v. 1, no. 4. John Murray expedition, 1933–34. London, The British museum, 1936. 13 pp., plate, charts. Price, 2s. 6d.

GRAY, L. C. Land planning. Chicago, The University of Chicago press, 1936. 37 pp. Price, $0.25.

GUMPERT, MARTIN. Trail-blazers of science; life stories of some half-forgotten pioneers of modern research. Tr. from the German by Edwin L. Shuman. New York, Funk & Wagnalls co., 1936. 306 pp. Price, $2.50.

HAMMOND, T. E. Vitality and energy in relation to the constitution. London, H. K. Lewis & co., 1936. 314 pp. Price, 12s. 6d.

HOLT, J. B. German agricultural policy, 1918–1934; the development of a national philosophy toward agriculture in postwar Germany. Chapel Hill, The University of North Carolina press, 1936. 240 pp., tables, maps. Price, $2.50.

HUXLEY, J. S., and A. C. HADDON. We Europeans; a survey of "Racial" problems, with a contribution by A. M. Carr-Saunders. New York, Harper & brothers, 1936. 246 pp., plates, tables, maps. Price, $3.50.

JONES, C. N. A botanical survey of the Olympic Peninsula, Washington. (Publications in biology, v. 5) Seattle, University of Washington, 1936. 280 pp., plates, tables, map. Price, paper, $2.

KANEHIRA, RYOZO. Formosan trees indigenous to the island. Taihoku, Formosa, Dept. of forestry, Government research institute, 1936. 574 pp., illus., plates.

KLAR, M. VON. Fabrikation von absolutem alkohol zwecks verwendung als zusatzmittel zu motor-treibstoffen. Halle (Saale), Verlag von Wilhelm Knapp, 1936. 84 pp., diagrs. Price, paper, RM. 4.20.

LETHBRIDGE, T. C. comp. Cemetery at Shudy Camps, Cambridgeshire; report of the excavation of a cemetery of the Christian Anglo-Saxon period in 1933. (Cambridge antiquarian society. Quarto publications, n. s. no. 5.) Bowes, 1936. 41 pp., illus. Price, paper, 5s.

MCKEOWN, K. C. Spider wonders of Australia. Australia, Angus & Robertson, 1936. 270 pp., front., plates. Price, 6s.

MALTNIAK, J. W. Sculpture in the living; rebuilding the face and form by plastic surgery. New York, Romaine Pierson, 1934. 203 pp., illus., plates. Price, $3.

MALTZ, MAXWELL. New faces—new futures; rebuilding character with plastic surgery. New York, R. R. Smith, 1936. 315 pp., illus. Price, $3.

MENZIES-KITCHIN, A. W. Land settlement; a report prepared for the Carnegie United Kingdom trustees. T. Edinburgh and A. Constable, 1935. 175 pp., tables, diagrs.

National geographic society, Washington, D. C. Our insect friends and foes and spiders; a series of fascinating stories of bee, ant, beetle, bug, butterfly, moth, and spider life. Washington, D. C. The Society, 1935. 252 pp., illus. Price, $2.50.

PRIPER, L. D. Seasonal distribution and occurrence of planktonic diatoms at Friday Harbor, Washington. (Publications in oceanography, v. 1, no. 2.) Seattle, University of Washington, 1933. 41–81 pp., tables, diagrs., map. Price, paper, $0.35.

PHILLIPS, W. W. A. Manual of the mammals of Ceylon. Ceylon, The Director, Colombo Museum. London, Dulau & co., 1935. 373 pp., illus., plates. Price, Rs. 10s; in England, 15s.

PLIMMER, R. H. A., and V. G. PLIMMER. Food, health, vitamins. 7th ed. London, Longmans, Green & co., 1936. 178 pp., front., tables, diagrs. Price, 3s. 6d.

RECORD, G. L. How to abolish poverty. Jersey City, N. J. The G. L. Record memorial association, 1936. 201 pp., front. Price, $1.

ROBERTS, A. M. Mechanical tests for engineering materials. London, The Draughtsman publishing co., 1935–36. 89 pp., illus., tables, diagrs. Price, 4s.

SANGER, MARGARET. Happiness in marriage. New York, Blue ribbon books, 1934. 231 pp. Price, $2.

SANGER, MARGARET. Motherhood in bondage. New York, Brentano's publishers, 1928. 446 pp. Price, $3.

SANGER, MARGARET. My fight for birth control. New York, Farrar & Rinehart, 1931. 360 pp., plates. Price, $3.

SANGER, MARGARET. Woman and the new race. New York, Blue ribbon books, 1920. 234 pp., front. Price, $1.

SCHARFF, J. W. Drainage et aménagements hydrauliques divers contre le paludisme. Traduction française, par Henry G. S. Morin & P. Moreau. Hanoi, Imprimerie d'Extreme-Orient, 1936. 160 pp., illus., tables.

SEWELL, R. B. S. An account of Addu Atoll. British museum (Natural history) Scientific reports, v. I, no. 3.) John Murray expedition, 1933–34. London, The British museum, 1936. 31 pp., plates. Price, 5s.

SEWELL, R. B. S. An account of Horsburgh or Goifurfehendu Atoll. British museum (Natural history) Scientific reports, v. I, no. 5. John Murray expedition, 1933–34. London, The British museum, 1936. 17 pp., plates. Price, 2s. 6d.

STONE, H. M. Contraceptive practices. Three reprints from "The Practice of Contraception"; an international symposium and survey, ed. by Margaret Sanger and Hannah M. Stone. Baltimore, Williams & Wilkins, 1933. 32 pp., illus. Price, $0.50.

TAYLOR, C. N. Odyssey of the Islands. New York, C. Scribner's sons, 1936. 234 pp., frontis., illus., plates. Price, $3.

Trinidad. Imperial college of tropical agriculture. Cacao research. Fifth annual report, 1936. Trinidad, printed by the Govt. print., 1936. 55 pp., plates, tables. Price, $1.25.

Wellcome foundation, limited, London. Spanish influence on the progress of medical science, with an account of the Wellcome research institu-

tion and the affiliated research laboratories and museums founded by Sir Henry Wellcome; commemorating the tenth International congress of the history of medicine held at Madrid, 1935. London, The Foundation, 1935. 121 pp., illus. gratis.

WOLF, F. A. Tobacco diseases and decays. Durham, North Carolina. Duke University press, 1935. 464 pp., illus. Price, $5.

REVIEWS

The Advance of Science. Edited by Watson Davis. Doubleday, Doran and Co., Garden City, New York, 1934. 400 pp., illus. Price, $3.50.

This book contains reviews of recent developments in various branches of science. Unpuzzling the universe or the latest in astronomy, stratosphere flights, glands and their hormones, polar explorations, fighting disease, archæological and anthropological investigations, and chemical discoveries, are some of the subjects discussed. The book is not only instructive but also very interesting. It is written in a popular style and can therefore readily be understood by the layman.—A. P. W.

The Algae and Their Life Relations; Fundamentals of Phycology. By Josephine E. Tilden. Humphrey Milford, Oxford University press, London: The University of Minnesota press, Minneapolis, Minnesota, 1935. 550 pp., illus. Price, $5.

Insofar as it presents its materials in an orderly fashion, this book will do duty as a guide to the student and teacher of phycology, a subject on which there has long been a need for an adequate textbook suitable for classroom use. Several features of the book, however, make one hesitate to recommend it to the uncritical user. For instance, in discussing the evolution and interrelationship of the algæ, the author gives the hypothesis that the various classes evolved under gradually changing conditions of illumination and in relation to a progressive invasion of the shallower waters and the littoral zone of a primeval ocean. But one can hardly find anything in the book that would back up such a contention. Moreover, in speaking of sexual reproduction in Rhodophyceæ on p. 101 she merely says that "it probably appeared in plants for the first time." With respect to this and other phases of her subject the uncertainty of the author is evident. Brushing aside, however, these few drawbacks of the book, it contains a good deal of useful information for the discriminating reader.—E. Q.

The Bacteriology of Typhoid, Salmonella, and Dysentery Infections and Carrier States. By Leon C. Havens. Humphrey Milford, Oxford University Press, London: The Commonwealth Fund, New York, 1935. 158 pp. Price, $1.75.

This publication is perhaps the most complete treatise available at present on enteric pathogens. It deals in a very elaborate manner with the laboratory procedures that have been found useful in the diagnosis of intestinal infections and carrier states. It is recommended to all bacteriologists and physicians for their guidance in solving their problems regarding enteric diseases.
—M. B.

Constructive Eugenics and Rational Marriage. By Morris Siegel. McClelland and Stewart, Ltd., Toronto, 1934. 196 pp. Price, $2.50.

This book is a welcome exposition of the young science of eugenics not yet well understood by many people. The simplicity of its language makes it attractive as well as interesting and instructive to lay readers. The need for instruction in heredity is apparent, for even in our modern medical schools this subject is barely touched upon. This volume will contribute greatly to the enlightenment of the younger generations as to their responsibility and part in the improvement of the race. The plan advocated under constructive eugenics is sane and worthy of further thought and study by educators, social workers, and health officers. Its local application will be a step forward in the betterment of the race. Professionals as well as parents will profit a great deal by its perusal.—U. D. M.

Diet and Die. By Carl Malmberg. Hillman-Curl, Inc., New York City, 1935. 149 pp. Price, $1.50.

This book is a startling revelation of the different diet fads and medicinal frauds that are now found in the market and are ruining the health of thousands of young girls. These unfortunate beings, in order to follow fashion, subject themselves to these fads and try to live on a diet which is not compatible with good health. In this book one will find many popular diets in vogue in America, criticized severely and their inconsistencies and dangers clearly presented. This book can be strongly recommended to young women in any country who are contemplating reducing treatment.—I. C.

The Frustration of Science. By Sir Daniel Hall and others. Foreword by Frederick Soddy. George Allen and Unwin, Ltd., London, 1935. 144 pp. Price, 3s. 6d.

This little book contains a number of scientific essays written by various English authors. In general these authors contend that the constructive aims of science have not been fully applied.

The most striking fact about the present-day world is the contrast between the vast possibilities of prosperity and the ap-

palling poverty of the majority of the population. Industry and science have made such huge advances that a large improvement in the standard of life, particularly of the workers, is now technically and immediately possible. But the social and economic structure of our western world is clearly of such a kind that we are unable at present to take full advantage of the technical progress which we have already achieved.

In addition to a foreword by Professor Frederick Soddy the book contains seven chapters with titles as follows: Science and Agriculture, Aviation, Science and Industry, Medicine, the Invention of Sterility, Bacterial Warfare, and the Frustration of Science.

These essays are quite interesting, and the criticisms that are brought out are worthy of serious consideration.—J. M.

An Introduction to Sex Education. By Winifred V. Richmond. Farrar and Rinehart, Inc., New York, 1934. 312 pp. Price, $2.50.

An Introduction to Sex Education is a comprehensive treatise on sex, written in simple and understandable language. The manifestations of sex among primitive peoples as compared to those among the civilized are brought out interestingly in this work. The book also gives a historical contrast of the question of sex in ancient times and in our modern age. Many will find the book not only interesting and entertaining, but also instructive. It helps in the study of sex from the social, economic, and educational standpoint.—U. D. M.

Manual of the Mammals of Ceylon. By W. W. A. Phillips. The Director, Colombo Museum, Ceylon: Dulau and Co., Ltd., London, 1935. 373 pp., plates, map, text figs. Price, Rs. 10, in England, Rs. 15.

This publication is the result of the author's long experience in the observation, collection, and study of the land mammals of Ceylon. A brief sketch of the historical geology of the island gives a good background of the evolution, migration, and distribution of species. A map of the island shows the main tracts of mammals, an important factor to species and subspecies formation. Nine orders with 23 families and 109 forms of mammals are treated. A key for the separation of higher into lower groups is given, and descriptions of groups are supplied whenever necessary. The trinomial has been freely used. An almost consistent arrangement of the annotations in the enumeration of the races has been followed, thus: scientific name, common English name, synonyms, popular (mostly vernacular) names, description, distribution, food, breeding, and habits.

The book is profusely illustrated; many of the pictures were taken from nature. A list of 43 references constitute the bibliography. This book is an important contribution to the fauna of Oriental regions, where work of this nature is greatly needed.—C. G. M.

The 1935 Year Book of the Eye, Ear, Nose, and Throat. The Eye, edited by E. V. L. Brown and Louis Bothman; The Ear, Nose, and Throat edited by G. E. Shambaugh and E. W. Hagens, with collaboration of G. E. Shambaugh, Jr. The Year Book Publishers, Inc., Chicago, Ill., 1935. 638 pp., illus. Price, cloth, $2.50.

This volume is one of the ten Practical Medicine Year Books, which now are in their thirty-fifth year.

In order to acquaint the busy specialist with recent advances in Ophthalmology and Otorhinolaryngology, the editors, as in previous volumes, have made concise but very comprehensive abstracts of articles on these subjects that appeared in 1935 in well-known journals all over the world. The references of these articles are given in the footnotes. One great value of this volume is the frank opinion and appreciation of the editors regarding certain articles abstracted, advising readers with regard to accepting the results of investigations thereon with caution.

It is highly recommended that every one practising this specialty should make it a point to have the Year Book every year in order to be well posted on recent and important advances.

—A. S. F.

Otosclerosis. By Louis K. Guggenheim. St. Louis, Missouri, 1935. 212 pp., illus. Price, cloth, $6.

Many theories have been offered on the etiology of otosclerosis. For over fifty years this condition has been the subject of intensive scientific investigation and philosophic consideration, but unfortunately we are still in the dark regarding its etiology.

The results of the investigations of Dr. Louis K. Guggenheim, done at the Oscar Johnson Institute, and his theory regarding the etiology of otosclerosis as discussed in the volume, should therefore be welcomed by the medical profession. The book contains six chapters: In the introduction the author makes critical comments and an excellent summary of the well-known theories of the etiology of this serious ear affection. In the second chapter he discusses in a very lucid manner his theory of regression.

The other chapters deal with phylogenesis, ontogenesis, pathogenesis, and pathogenesis and autopsis. Clear microphotographs and excellent illustrations add greatly to the value of the book.—A. S. F.

Petroleum Development and Technology, 1936. (Transactions of the American Institute of mining and metallurgical engineers, v. 118). The American Institute of Mining and Metallurgical Engineers, New York, 1936. 536 pp., illus., tables, diagrs. Price, $5.

The present volume of the Transactions, Petroleum Development and Technology, 1936, consists of 536 pages and contains papers and production statistics presented in the meeting held in Houston, Texas, and in the annual meeting in New York. Interesting papers on the estimation of oil reserves are given. Other papers included deal with various phases of production and research engineering, covering the latest developments of the petroleum industry of the United States.—F. D. R.

Physicians' and Surgeons' Textbook on Endocrinology and Ready Reference Therapy. By Theodore H. Larson. Chicago College of endocrinology, Los Angeles, Calif., 1934. 870 pp. Price, $10.

This book contains a detailed study of the thirteen hormones of men. Each hormone is discussed from its physiology, pathological physiology, etiology, symptomatology, and diagnosis to therapy and prognosis. Various physical make-ups are illustrated with pictures and their hormonal relative and exchange values are given.

The last part of the book deals with diseases and their hormone treatment. This part is interesting. Hormone therapy seems reasonable although its efficacy and practicability look doubtful. For instance, which market is now selling the master hormone or the isolated splenic hormone?—I. F.

The Practice of Ionization. By J. Newton Dyson. Henry Kimpton, London, 1936. 178 pp., illus. Price, 6s.

This is a concise, brief book on the uses of the galvanic current in the treatment of different diseases. It defines the word "ionization" as the "movement of ions" taking place in an electrolyte resulting from the passage of the galvanic current through it.

The book begins with the discussion of the elementary principles of the electric current, then proceeds to the apparatus from which the current may be obtained and later to the method of its application. There is a chapter on "Ionization." The rest of the book treats of the clinical application of "ionization,"

giving the results of the treatment according to the experience of the author. Some of the diseases in which this kind of electrical treatment may be of benefit are arthritis, deafness, and tinnitus, resulting from chronic otitis media and otosclerosis, fibrositis, sciatica, paralysis from cerebral and spinal lesions, neuritis, Raynaud's disease, and some forms of dermatosis and gynecological conditions, exophthalmic goitre, mucous colitis, rectal fistula and pyorrhea.—A. P. W.

School Education in Hygiene and Sex; Lectures Given at Felsted School. By G. O. Barber. W. Heffer and Sons Ltd., Cambridge, England, 1936. 71 pp. Price, 2s. 6d.

These lectures attempt a rather superficial discussion of the make-up and physiology of the human body. The question of sex is brought out in a most natural and simple way. The chapter on venereal diseases and how they are acquired is the most valuable part of the book. The young and innocent are made aware of the sufferings caused by these diseases. To parents, teachers, and students, this book will serve as a useful guide in keeping the body healthy. There is, however, one thing the author failed to include in his book and that is how to overcome or curb strong sexual instincts through education, athletics, harmless pastimes, and by other means.—I. F.

Sex. By B. P. Wiesner. (The Home University Library of Modern Knowledge.) Thornton Butterworth Ltd., London, 1936. 251 pp. Price, $0.75.

This interesting little book takes up the study of sex in animals. The scientific observations of sex behavior in various kinds of animals are of interest to the biologist, anatomist, and other scientists. The "differentiation of sex in the embryo" and "The mechanism of the determination of sex" are taken up exhaustively.

The book has not been proof-read properly as there are in the text, in parentheses, numerous references to pages and figures that are entirely lacking.—U. D. M.

Thirty Years with the Philippine Head-Hunters. By Samuel E. Kane in collaboration with Clarence H. Larmore. Grosset and Dunlap Publishers, New York, 1933. 331 pp., illus. Price, $1.

This book deals with the personal experiences of the author, who stayed 30 years among the pagan ethnological groups of northern Luzon. His long stay in that region made him familiar with the various typical customs and beliefs of these groups, such as their trial marriage, head-hunting, dog-eating, and their

canyao or ceremonial feast. The author is likewise familiar with the Mohammedan custom of running amuck in Mindanao. The book which carries several illustrations is written in plain and simple language, and is of particular interest to students of Philippine ethnography.—R. E. G.

Tobacco Diseases and Decays. By Frederick A. Wolf. Duke University press, Durham, North Carolina, 1935. 454 pp., illus. Price, $5.

This volume is the most comprehensive treatise ever written on the subject. It will doubtless serve as an excellent guide for tobacco growers in the identification of most, if not all, diseases affecting their crops and in adopting the proper methods of control. In like manner it will be useful to agricultural advisers and superintendents in tobacco districts, and to students and researchers on tobacco diseases, in orienting themselves with their particular problems. It carries information covering not only diseases prevalent in the fields but also decays to which tobacco is susceptible during curing, during fermentation and storage, and after its manufacture into cigars and cigarettes. Hence this book is likewise of value to cigar manufacturers.—F. B. S.

ERRATUM

VOLUME 61

Page 447, *for* Rollin G. Meyers, the author, *read* Rollin G. Myers.

INDEX

[New names and new combinations are printed in boldface.]

A

Aberrentia, 467, 469–471, 473, 474, 492, 493, 508.
Ablabesmyia Johannsen 42.
Acanthephyra A. M. Edw., 469, 472, 487.
  acutifrons Spence Bate, 487,
  brachytelsonis Spence Bate, 487,
  exmea var. brachytelsonis de Man. 487.
  longidens Spence Bate, 487.
  media Spence Bate, 487.
  microphthalma S. I. Sm., 487.
  rostrata de Man. 487.
  rostrata (Spence Bate). 487.
Acanthephyridæ Spence Bate, 469, 472, 487.
Acanthocephala, 163, 126.
  parasitic in marine fish, 163.
Acanthogyrus acanthogyrus Thapar, 388.
Acanthopsychidæ, 550.
Acanthopus gibbsi M. Edw., 640.
Acanthosoma Spence Bate, 470, 488, 496.
  macrotelsonis Spence Bate, 496.
Acantrus spino-hirsutus Lockington, 539.
Acetes, 436.
Achæopsis Stimpson, 427, 550,
  sulcatus Rathbun, 550.
Achæus Leach, 477, 548.
  villosus Rathbun, 548,
Acholoe granulatus A. M. Edw., 521.
  orbiculatis Richters, 520.
  xanthusi Stimpson, 520.
Acheron trux Walk., 288.
Achiranthes baikalensis Skv. and Mey., 290, 314.
  calcar Cleve, 290, 315.
  cleveï Grun., 195, 312,
  cleveï Grun. var. rostrata Hust., 208, 313.
  delicatula Kütz., 312.
  exigua Grun. var. baikalensis Skv., 313.
  hastata Skv. and Mey., 302, 313.
  kisaki Skv., 195.
  lacus baikali Skv., 302, 312.
  lanceolata Breb., 299, 314.
  lanceolata Breb. var. elliptica Cleve, 314.
  lanceolata Breb. var. rostrata Hust., 314.
  linearis, 195.
  linearis W. Sm. var. nipponica Skv., 193.
  meyeri Skv., 302, 312.
  minutissima Kütz. var. cryptocephala Grun., 194.
  pentrupsii (A. Cleve) Hust., 312, 313.
  pentrupsii (A. Cleve) Hust. var. minuta Skv., 299, 314.
  skvortzowi Skv., 195.

Achnanthes—Continued.
  pennatelli Brun and Herib., 299, 315.
  pinnata Hust var. japonica Hust., 195.
  profunda Skv., 302, 312,
  striata Skv. and Mey., 302, 312.
Achnanthidium coarctatum, 296,
  exile, 296.
Aciculida Ramsom, 434.
Aconchus urbanus Horvath, 17.
Acrilobrevis tristis, 427.
Acrocerus, 272.
Actæinus, 542.
Actæ, 475.
Actæa de Haan, 526.
  A. M. Edw., 526.
  bella A. M. Edw., 528.
  hirsutissima Alcock, 527,
  hirsutissima de Haan, 527,
  hirsutissima (Rapp.), 527.
  rapapellii A. M. Edw., 527.
  rapapellii Krauss, 527.
  suffusca Rathbun, 527,
  tomentosa A. M. Edw., 526.
Actæinus, 526.
Actæodes bellus Dana, 533.
  tomentosus Dana, 527.
Actinomyces, 439, 440, 444, 447, 449, 454, 457, 458, 460.
  albidoflavus, 460.
  niger, 460.
  polychromogenes, 460,
  roseus, 460.
  violaceus, 460.
Actinomycetes, variations in, in connection with the theory of the mycotic nature of the viruses of tuberculosis and leprosy. 439.
Actinopleura, 471.
  granulosus de Haan, 523.
  rugata Adams and White, 527.
  rapapellii Krauss, 527.
AFRICA, CANDIDO M., WALFRIDO DE LEON, and EUSEBIO Y. GARCIA, Heterophyidiasis. V: Ova in the spinal cord of man. 393.
Ataxiidæ, 131.
Athanas F., 474, 509.
  niteropa White, 509.
  symmista (Hilgn.), 509.
  symmista Miers, 509.
Atyoncidæ Stimpson, 434, 509.
ALEXANDER, CHARLES P., New or little-known Tipulidæ from eastern Asia (Diptera). XXXIV. 143.
Allonthucha Drake, 18.

Alpheidae, 468, 472, 479.
Alpheus F., 468, 472, 479.
aculeipes Coutiere, 481.
acutofemoratus Dana, 479.
alcyone de Man, 481.
bicostatus de Man, 482.
biunguiculatus Stimpson, 479.
collumianus Stimpson, 480.
cupreobrinus de Man, 480.
coutieri de Man, 481.
crinitus Dana, 479.
edwardsii var. leviusculus Dana, 479.
frontalis A. M. Edw., 480.
gracilidactylus Miers, 482.
hippothoë de Man, 481.
latidens Lanchester, 481.
laticeps A. M. Edw., 480.
lepidus Miers, 480.
malabaricus de Man, 480.
malabaricus (Spence Bate), 480.
malabaricus var. gracilicarpus de Man, 480.
micrei Coutiere, 482.
militis Dana, 480.
pacificus de Man, 482.
neptunus Dana, 480.
pachychirus Stimpson, 482.
pacificus Dana, 481.
parvilycus Coutiere, 481.
parvirostris Dana, 481.
parvirostris var. leucothea de Man, 481.
parvirostris Dana, 481.
rapax var. micrei Coutiere, 482.
spinifer Stimpson, 479.
strenuus Dana, 481.
Alpus longimembris, 131.
Amathia Roux, 550.
Ammianus crosus Dist., 19.
Amphicentridae, 229.
Amphiacanthus ornatus Bl. and Schn., 183, 184, 229, 230; artificial fertilization of, 229.
Amphiascus jerseensis Okam., 257.
Amphinemura flavicollis Klap., 274.
nigritula Navas, 274.
Amphion, 469.
Amphiplectus, 468.
Amphipleura pellucida Kütz., 186.
pellucida Kütz. var. rostra Kitton, 186.
Amphipoda, 294, 295.
Amphiporus formosanus Okam., 250.
Amphistylis hastaloides de Haan, 520.
Amphora, 298, 349.
costulata Skv., 300, 342.
delphinea (Bail.) A. Sm., 301, 343.
delphinea var. minor Cleve, 301, 343.
libyca Ehr., 297.
lineolata, 298.
mongolica Oestrup, 300, 341, 342
mongolica Oestrup var. baikalensis Skv., and Mey., 342.
mongolica Oestrup var. cornuta Skv., 341.
Amphora—Continued
mongolica Oestrup var. cornuta fo. interrupta Skv., 341.
mongolica Oestrup var. gracilis Skv., 341.
normani Rabh., 297, 300, 340.
obtusa Greg. var. baikalensis Skv., 302, 343.
ovalis Kütz., 296, 298, 300, 340–342.
ovalis Kütz fo. gracilis (Ehr.) Cleve, 340.
ovalis Kütz. forma gracilis Kütz., 296.
ovalis Kütz. var. constricta Skv., 340.
ovalis Kütz. var. libyca (Ehr.) Cleve, 297.
ovalis Kütz. var. pediculus Kütz., 297, 340.
perpusilla Grun., 300, 341.
proteus Greg., 343.
proteus Greg. var. baikalensis Skv., 302, 343.
rotunda Skv., 302, 342.
sibirica Skv. and Mey., 300, 342, 343.
sibirica Skv. and Mey. var. gracilis Skv., 300, 342.
Anaimathia Sm., 477, 550.
pulchra Miers, 550.
Anatopynia Johannsen, 22, 34.
brevicalcar Kieff., 35.
goetghebueri Kieff., 36, 39.
japonica Tokunaga, 35, 41.
kibunensis Tokunaga, 35, 41.
nebulosa Meig., 36, 40, 41.
nugax Walk., 42.
ornata Meig., 39.
varia F., 35.
vosiimorai Tokunaga, 35, 38.
Aneylus, 360, 315, 321.
Anchocaris Spence Bate, 468, 472, 486.
quadriculus Spence Bate, 486.
Anticulus Dana, 474, 504.
anticulus Alcock, 504.
anticulus (Herbst), 504.
Ankylopteryx delicatula Banks, 250.
delicatuli Brauer, 250.
octopunctata F., 250, 251.
Annandalia carla Needham, 276.
indica Ulmer, 275.
maindroniana Navas, 275.
Anomalia, 506.
Anombranchiata, 486.
Anonymonema ehlii (Kütz.) Cleve var. lanceolata A. Mayer, 293.
Anomura, 467, 474, 492, 500, 508, 511.
Anopheles annulipes, 126, 128, 130.
barbirostris, 128, 129, 130.
flavirostris, 126.
fuliginosus, 126, 129, 131.
minimus, 125, 126, 128, 130, 132.
subpictus, 132.
vagus, 127, 129, 131.

Anopheline ecology, 125.
Anoplocephalidæ Chofodkovsky, 408.
Aporina Fuhrmann, 409.
delafondi Railliet, 409, 456.
Arcania Leach, 475, 513.
granulosa Miers, 514.
novemspinosa (Adams and White), 513.
novemspinosa Hilg. 514.
undecimspinosa de Haan, 514.
Arctus Dana, 470, 478, 495.
ribberosus de Man, 496.
orientalis Spence Bate, 495.
Aristeopsis armatus Bate, 494.
Axiopsis Duvernoy, 470, 478, 494.
armatus Spence Bate, 494.
ARRIOLA, FELIX J., see BLANCO and ARRIOLA.
Artemesia, 470.
Artificial fertilization of dangit, 229.
Ascalaphidæ, 285.
Astacidæ, 471.
Astacidea, 470, 471, 473, 497.
Astacoides, 471.
Astacopsis, 471.
Astacus 471.
Ateryatis A. M. Edw., 476, 524.
de Haan, 478, 524.
floridus de Haan, 524.
floridus (Rumph.) 524.
integerrimus Dana, 525,
integerrimus var. typica Ortmann, 524, 525.
limbatus Dana, 523.
subtilivisus White, 524,
Alersatopsis A. M. Edw., 475, 524.
agenata (Adams and White), 524.
signatus A. M. Edw., 524.
Athanas, 468.
Atya Leach, 463, 472, 485,
armata M. Edw., 485,
brevirostris de Man, 485,
gustavi Ortmann, 485.
moluccensis de Haan, 485,
serrata Spence Bate, 485.
Atyidæ, 464, 472, 485.
Atyoida tahitensis Stimpson, 485.
Axiidæ 471, 474, 500.
Axiopsis Borradaile, 471, 474, 500.
(Axiopsis) consobrina de Man, 500.
(Eiconaxius) sibogæ de Man, 500.
(Neaxius) plectorhynchus de Man, 500.
(Neaxius) plectorhynchus Strahl, 500.

B

Baicalia, 294.
Baikal seal, 293.
Baikal sponge, 294.
Baling, 230.
Baling-baling, 230.
Balinsasayao, 386.
Balucuguy, 219.
BANKS, NATHAN, Neuropteroid insects from Formosa, 255.
Baptozius Alcock, 476, 520.
vinosus Alcock, 520,
vinosus (M. Edw.), 520.
Barangan, 229.
Barawis, 229.
Batavenyi, 229.
Belenus dentatus Dist., 15.
dentatus Pfeffer, 15.
Benedictia, 294.
Bentheogeris, 469.
Bentheogrymus Spence Bate, 470, 473, 494.
altus Spence Bate, 494.
pleocanthus Spence Bate, 494.
Bestetus japonica Navas, 279.
Betaeus, 466.
malleodigitus Spence Bate, 480.
Birds, tapeworm parasites of Philippine, 409.
Birgus Leach, 474, 506.
latro Leach, 506.
latro (Linn.), 506,
Bithynia, 469.
grandimanus Spence Bate, 480,
lar Spence Bate, 488.
BLANCO, GUILLERMO J., and FELIX J. ARRIOLA, Five species of Philippine Abrinus of the genus Penaeus, 219.
Boerneforus, 362.
Books, 115, 401, 561.
Brachycarpus, 469.
Brachyura, 474-478, 500, 509, 511.
Bredenbachius Dist., 6, 7, 20.
pictus Dist., 7.
Bryozoa, 274.
Bubalus ibis coromandus Bodd., 137.
Bubalus ibis coromandus Bodd., 139.
Bubul, Philippine, 439.
Bunuan, 229.
Butastur indicus, 137, 434,
Bynoarca sp., 547.

C

Cadamustus typicus Dist., 16.
Caecilius, 261, 267.
annulicornis Okam., 262.
aridus Hagen, 261,
confusus Banks, 263, 264.
dolorosus Hagen, 263, 264.
fuividumalis Okam., 262.
fraternus Banks, 262,
fuscipterus, 264,
genoscigena Kod., 262.
hirsutayanus Endl., 262.
japonicus Kod., 262.
muguenburzi Endl., 262-264.
okamotoi Banks, 262,
podiceromelas Kod., 261,
similaris Banks, 263, 264.
stipennatus Okam., 262.
tenuicornis Kaeny, 263.
Calappa philargius Nobili, 516.
tuberculata Dana, 515.
Calappidæ, 473, 510, 515.

Calaptrinæ Dana, 515.
Calbenna microbarica, 413.
Calcinus Dana, 474, 505.
elegans Dana, 505.
elegans (M. Edw.), 505.
herbstii Alcock, 505.
herbstii de Man, 505.
latens Alcock, 505.
latens (Randall), 505.
tenuipes (Randall), 505.
Callianassa Leach, 471, 474, 492.
mucronata Strahl, 499.
Callianassidæ, 471, 476, 490.
Callisoma, 471.
Callisoma, 471.
Calocaris, 471.
Calocaris delicatula Skv., 302, 318.
ignorata Skv., 299, 318.
latissima (Kütz.) Cleve, 290, 316.
latissima (Kütz.) Cleve var. rostrata Skv., 318.
lepidula (Grun.) Cleve, 318.
nipponica Skv., 301, 318.
pennata, 292.
reflexa Skv., 302, 316.
schumanniana (Grun.) Cleve, 299, 317.
schumanniana var. baikalensis, 318.
schumanniana (Grun.) Cleve var. biconstricta Grun., 317.
schumanniana (Grun.) Cleve var. biconstricta Grun. fo. baikalensis Skv., 317.
schumanniana (Grun.) Cleve var. biconstricta Grun. fo. undulata Skv., 317, 318.
schumanniana var. trinodis Lewis, 318.
silicula (Ehr.) Cleve, 297, 298, 312.
silicula var. kjellmaniana Cleve, 317.
silicula var. major, 299.
? silicula (Ehr.) Cleve var. major Skv., 317.
silicula (Ehr.) Cleve var. tumida Hust., 197.
silicula var. ventricosa (Ehr.) Donkin, 317.
simplex Skv., 301, 318.
undulata Skv. and Mey., 317.
zachariasi Reich., 298, 316.
zachariasi Reich. var. constricta Skv., 316.
zachariasi Reich. var. elongata Skv., 316.
Calyptrocus, 268.
infelix, 268.
Cambarus, 471.
Camptonotus, 459.
Campylaspis Latr., 417, 549.
retusa Adams and White, 549.
retusa Latr., 549.
Campylodiscus, 362.
fragilis Skv., 362.
fragilis Skv. var. punctata Skv., 362.
Campylodiscus—Continued.
fragilis Skv. var. rigens Skv., 361.
lacus baikali Skv., 360.
lacus baikali Skv. var. annulata Skv., 362.
lacus baikali Skv. var. bispidula Skv., 361.
noricus Ehr., 361.
rutilus Skv., 362.
spiralis, 296.
sp., 301.
Cancer admeta Herbst, 518.
asperatus Herbst, 523.
aviculus Herbst, 504.
anomalous Herbst, 499.
arachnoides Rumph., 554.
arenarius Guérin, 542.
arrosor Herbst, 503.
cibinarius Herbst, 501.
clypeata Herbst, 507.
contractus Herbst, 508.
convexus Forsk., 523.
cranifaris Linn., 511.
crementatus Rumph., 506.
cursor Herbst, 542.
cymodoce Herbst, 530.
depressus F., 540.
emaritus Herbst, 508.
floridus Rumph., 524.
granosus Linn., 535.
hastatus Herbst, 520.
horridus Linn., 557.
integerrimus M. Edw., 524.
litteratus F., 509.
maculatus Linn., 522.
meridies Herbst, 503.
messor Forsk., 535.
natator Herbst, 517.
niger Forsk., 527.
pelagicus F., 520.
prymna Herbst, 519.
quadratus F., 542.
rubber Rumph., 502.
rufopunctata Herbst, 531.
ruricola Linn., 541.
sanguisolentus Herbst, 526.
scalatus Rumph., 523.
serratus Forsk., 521.
tridentatus Herbst, 517.
spinimanus Herbst, 540.
strigosus Herbst, 535.
symmista Linn., 502.
terrestris cuniculus sub terra agens Sloane, 541.
tetragonon Herbst, 543.
vespertilio F., 529.
vocans Linn., 542.
vocans minor Herbst, 542.
Cancridæ, 516, 530.
Cancroidea, 516.
Caphyrinæ, 517.
Cantacader quinquecostata (Fieber) Stål, 1.
Capritus convexus (Forsk.), 523.

Carcinæ, 630.
Carcininæ, 517, 522.
Carcinoplacinæ, 633.
Carcinoplax M. Edw., 478, 533.
  /angusta Rathbun, 533.
  bispinosa Rathbun, 533.
  confragosa Rathbun, 533.
  purpurea Rathbun, 533.
  speculatis Rathbun, 533.
  spinosissima Rathbun, 533.
  verdensis Rathbun, 533.
Carcinus, 517.
Cardisoma Latr., 476, 541.
  carnifex Alcock, 541.
  carnifex (Herbst), 541.
  guanhumi var. carnifex Ortmann, 541.
  hirtipes Dana, 541.
Caricyphidæ, 458, 472, 486.
Caricyphus Spence Bate, 458, 472, 486.
  cornutus Spence Bate, 486.
  turgidus Spence Bate, 486.
Caridina M. Edw., 458, 472, 485.
  brachydactyla subsp. peninsularis Kemp, 485.
  brevicarpalis var. ondobensis de Man, 485.
  gracilirostris de Man, 485.
  gracillima Lanchester, 485.
  laevis Hilg., 485.
  modigliani Nobili, 486.
  nilotica var. brachydactyla de Man, 485.
Carpilius Leach, 476, 522.
  Desmarest, 475, 522.
  A. M. Edw., 475, 522.
  cinctimanus White, 523.
  convexus Rupp., 523.
  maculatus Linn., 522.
  maculatus Miers, 522.
  signatus Adams and White, 524.
Carpilodes Dana, 476, 523.
  A. M. Edw., 475, 523.
  bellus (Dana), 523.
  bellus Miers, 523.
  cinctimanus Miers, 523.
Carpiliidæ, 522.
Cassiopea, 514.
Catometopa, 476, 477, 531, 533
Cattle egret, trematode parasite of, 137.
Ceratocarcinus Adams and White, 478, 559.
  longimanus Adams and White, 559.
Ceratonesia aerea Hilg., 293, 307.
  Junaria, 296.
Cerconychia brunnea Klap., 269.
  livida Klap., 269.
Ceratoplax Stimpson, 476, 534.
  fulvida Rathbun, 534.
  truncatifrons Rathbun, 534.
Chalcophaps indica, 413.
Charybdis de Haan, 476, 517, 518.
  crucifera Dana, 517.
  riversandersoni Alcock, 517.
  truncata Stimpson, 518.
  (Goniohellenus) ornata Alcock, 518.
Charybdis—Continued.
  (Goniohellenus) ornata A. M. Edw., 518.
  (Goniosoma) anisodon (de Haan), 518.
  (Goniosoma) crucifera (F.), 517.
  (Goniosoma) merguiensis Alcock, 518.
  (Goniosoma) merguiensis (de Man), 517.
  (Goniosoma) miles Alcock, 517.
  (Goniosoma) miles (de Haan), 517.
  (Goniosoma) natator Alcock, 517.
  (Goniosoma) natator (Herbst), 517.
  (Goniosoma) riversandersoni Alcock, 517.
Chasmocarcinus, 476, 534.
  crassimanus Rathbun, 534.
Check list of Philippine Crustacean decapods 485.
Chelopistes, 421.
Cheirothrix, 469.
Cheramus, 471.
Cherops, 471.
Chicken, wild, 417.
Chironomidæ from Japan, 21.
Chloridæ in mesopheline ecology, 125.
Chlorilina, 476.
Chlorodinæ, 522, 527.
Chlorododa, 527.
Chlorodius A. M. Edw., 527.
Chlorodius areolatus Adams and White, 528.
  cavipes Dana, 525.
  exaratus M. Edw., 525.
  hirtipes White, 527.
  niger (Forsk.), 527.
  nitor Rupp., 527.
  nudipes Dana, 525.
  sanguineus M. Edw., 526.
Chlorodopsis A. M. Edw., 476, 527.
  pilumnoides de Man, 527.
  pilumnoides White, 527.
Chlorotocus, 469.
Chorilia Dana, 477, 552-554.
Chorilia sphenocarcinoides Rathbun, 553.
Chorinus, 468.
Chrysocera formosana Okam., 285.
Chrysopa, 281.
  adonis Banks, 282.
  angingensis E. Petersen, 283, 292.
  astur Banks, 281, 283.
  bambi Walk., 282, 285.
  bonineana, 282.
  cognata, 282, 295.
  cosmetula Okam., 281, 282.
  decorata E. Petersen, 281, 282.
  eudora Banks, 281, 283.
  forma, 285.
  formosana Mats., 282.
  fureifera, 281, 285.
  mareida Banks, 282, 284.
  petersoni Okam., 281, 282, 285
  ruficeps McLach., 281, 285.
  sauteri E. Petersen, 282.
Chrysopidæ, 280.
Cirve, 517.
Cladothrix, 440.

Chaerius circumspinifer, 148.
Chlamarius Dana, 474, 500.
antilensis Stimpson, 501.
chlamarius (Herbst), 501.
chlamarius Hilgendorf, 501.
corallinus Alcock, 500.
coralliotus (M. Edw.), 500.
crenatatus (M. Edw.), 501.
crysternus de Man, 501.
crysternus Hilgendorf, 501.
inflexipinatus Hilgendorf, 501.
pulcherrimus de Man, 501.
philippinensis Yaschinow, 501.
sciosetarius Herbst, 501.
serrulatus Dana, 501.
Chionetes Kroll., 22.
decem-pumctatus Tokunaga, 22, 23, 27.
formosae Kroll., 22, 24.
immaculatus Kroll., 23, 24, 26.
japonicus Tokunaga, 22, 25.
lamarcnotus Kroll., 22, 25.
latifrons Merg., 25.
nuglamai Tokunaga, 22, 26.
Coccinella dimidiata Fant., 208, 211.
marginata, 226.
placentula, 296.
placentula (Ehr.) var. baikalensis Skv., 208, 210.
placentula (Ehr.) var. euglypta (Ehr.) Crotch, 294.
placentula (Ehr.) var. lineata (Ehr.) Crotch, 208, 210.
placentula (Ehr.) var. russii Brun and Herib., 211.
rubida, 296.
strolata, 296.
Cocloiumypus Kroll., 22.
Cenobita Latr., 474, 506.
cavipes Stimpson, 506.
clypeata (Herbst), 507.
clypeata Latr., 507.
compressa Miers, 506.
compressa var. rugosa Bouvier, 506.
perlata M. Edw., 506.
purpurea Stimpson, 506.
rugosa M. Edw., 506.
violascens Heller, 506.
Canolabula Dana, 474, 506.
Colloenia, 390.
francica, 390, 392.
francica germani Gust., 391, 393, 388, 389.
francica vestita, 391.
fuciphaga Thunb., 390.
germani, 390.
inexpectata, 390.
javensis, 390.
marginata Salv., 393, 389.
nuicans, 390.
troglodytes Gray, 390.
vestita, 390.
Columba punicea, 413.
sp., 413.
Columbiformes, 412.
Comephorus baicalensis Dyb., 293, 295.
dybowskii Kor., 293.
dybowskii, 295.
CONCEPCION, ISABELO. The nutritive value and cost of the Philippine Constabulary ration, 59.
Coniocompsa furcata Banks, 277.
vesiculigera, 277.
Coniopterygidae, 277.
Coniopteryx albata End., 277.
Copepoda, 294.
Corocticina hyalina Okam., 278.
Corone philippina, 420, 422, 428.
Corvus columnianus, 422.
interorhynchus, 427.
splendens insolatus, 422.
Corycphoemila, 263.
Corystes Latr., 516.
(Erdea) vicinispinosus de Haan, 516.
Corystidae, 475, 516.
Coscinodiscus, 297, 301.
radiatus Ehrenb., 301, 305.
Cottocomephoridae, 293.
Corugnia Dumaro, 474 420.
crassa Fuhrmann, 425.
cuneata var. nervosa Meggitt, 424.
dicranophora Pascuale, 425.
Hocsen Tubangui and Masilungan, 424, 425.
meggitti Yamaguti, 424.
noctua Johrl, 425.
plurioncinata Baer, 425.
rimandoi Tubangui and Masilungan, 425, 425.
taiwanensis Yamaguti, 425.
Crangon, 469.
Crangonidae, 469, 472, 478.
Crangonoidea, 469, 472, 478.
Ctenogrin, 257.
Ctenotrus, 58.
Crocodilus porosus, 131.
Crocopus phoenicopterus, 413.
Crossocerus wesmaeli Lindem., 31.
Crustacea, 294.
Crustaceus decapods, a check list of Philippine, 465.
Cryptocnemus Stimpson, 475, 512.
macrocanthus Ihle, 512.
Cryptodromia, 473, 510.
lateralis (Gray), 510.
lateralis Henderson, 510.
Cryptorrolia M. Edw., 474, 557.
ikenella Adams and White, 557.
dorsalis White, 557.
Cula cula, 393, 389.
Culicoides, 43.
Cyclograpsus lateralis M. Edw., 539.

Cyclomtopa, 475, 476, 516.
Cyclophyllidea, 409.
Cymbella, 296.
Ambigua, 298.
baikalensis, Skv. and Mey., 294, 296, 297, 301, 304, 305.
baikalensis Skv. and Mey. fo. minuta Skv., 305.
baikalensis Skv. and Mey. fo. ornata Skv., 305.
baikalensis Skv. and Mey. fo. stellata Skv., 305.
baikalensis Skv. and Mey. fo. typica Skv., 305.
comta (Ehr.) Kütz. 192.
comta var. radiosa fo. major, 297.
Ductzingiana, 296.
Hemichiniana Kütz., 192.
naviculata, 296.
stelligera Cleve and Grun., 192.
striata (Kütz.) Grun., 301, 305.
striata (Kütz.) Grun. var. magna K. Mey., 297, 306.
Taylorum, Brightw., 301, 305.
Cymatopleura, 300.
apiculata Grev., 357.
elliptica (Breb.) W. Sm. var. constricta Grun., 357.
solea (Breb.) W. Sm., 214, 216, 356.
solea (Breb.) W. Sm. var. apiculata (W. Sm.) Grun., 357.
Cymbella, 298, 334.
alpina Grun. fo. nipponica Skv., 297.
amphicephala Naeg. var. unipunctata Born. 299, 344.
aspera (Ehr.) Cleve, 299.
austriaca A. S., 299.
australica A. Schmidt fo. elongata Skv. and Mey., 301, 343.
austriaca Grun., 343.
baikalensis Skv. and Mey. var. Reinhardi Skv. and Mey., 348.
capricornis Skv., 300, 348.
cistula (Hemp.) Grun., 299, 300, 347.
cistula (Hemp.) Grun. var. arctica Lagerst., 347.
cistula var. baikalensis, 297.
cistula var. gracilis fo. lata, 297.
cistula (Hemp.) Grun. var. maculata (Kütz.) Van Heurck, 347.
cuspidata Kütz., 300, 346.
cymbiformis, 296.
cymbiformis (Agardh Kütz.) Van Heurck, 298.
ehrenbergii Kütz., 295, 300, 345.
ehrenbergii Kütz. var. elongata Meister, 346.
ehrenbergii Kütz. var. Gutwinskii Wisl., 297, 345.
gastroides subsp. subatomatophora, 295.
Cymbella—Continued.
Gracilis (Rabh.) Cleve, 298.
Grossouri, 295.
Gutwinskii (Wisl.) Skv. and Mey., 300, 346.
gutwinskii Skv. and Mey. var. intermedia Skv. und Mey., 345.
heteropleura Ehr. var. minor Cleve, 297, 300, 345.
hustedtii Krasske, 299, 343.
hybrida Grun., 298.
inelegans Cleve var. baikalensis Skv., 301, 346.
lacustris Ag. fo. baikalensis Skv. and Mey., 300, 344.
lata Grun, 344.
leptoceros (Ehr.) Grun., 297.
meisteri Skv. and Mey., 300, 345.
microcephala Grun., 297.
navicula Skv., 293, 344,
naviculiformis, 296.
parva (W. Sm.) Cleve, 300, 347.
prostrata (Berk.) Cleve, 298, 300, 346.
sinuata Greg., 300, 344.
stuxbergii Cleve, 296, 300, 347.
stuxbergii Cleve var. baikalensis Skv., 345.
stuxbergii Cleve var. intermedia Wisl., 297, 345.
tumida, 296.
turgida (Greg.) Cleve, 301, 344.
turgida (Greg.) Cleve fo. minor Skv., 298.
turgida var. robusta Skv., and Mey., 346,
turgidula Grun., 298.
ventricosa Kütz., 296, 300, 346.
sp., 297, 345.
Cymnopoma, 545.
Jurisii White, 548.
Cystonaia Mera, 477, 550.
echinata Rathbun, 650.
horrida Rathbun, 550.
Cystochila Horvath, 7.
Stål, 6, 7, 10, 11.
abundantis Drake and Poor, 8.
bakeri Drake and Poor, 9.
callea Stål, 6.
elongata Dist., 7.
fecta Drake and Poor, 9.
nexa Dist., 7.
picta Dist., 7, 8.
sordida, 7.
taeniophora Horvath, 7.
tingoides Motsch., 7.
vicenda Drake and Poor, 8.

D

Dangit, 229; artificial fertilization of, 229.

Daldorfia, 478, 557.
horrida (Linn.), 557.
horrida Rathbun, 557.
Dardanus hessi Rathbun, 602.
Davaineidae Fuhrmann, 510.
Decapoda, 468, 478.
Decapoda, a check list of Philippine crustaceans, 465.
Dendrobranchiata, 466, 467, 470, 473, 482.
Dendrolemmus, 286.
Dendroleoninl, 285.
Denticula sinuata, 256.
thermalis, 256.
Diaptesa (Diaptesa) plumitonsis Tokunaga, 65.
Diaptesinae, 21, 66.
Diatoms, bottom, from Olhon gate of Baikal Lake, Siberia, 293.
Diatoms from Ikeda Lake, 191.
Dicranomyia robusta de Meij., 751.
Didymosphenia dentata Dor., 297, 300, 349.
dentata Dor. var. genuina Skv. and Mey., 349.
dentata fo. elongata Skv. and Mey., 349.
dentata Dor. var. genuina Skv. and Mey., 349.
dentata Dor. var. subcapitata Skv. and Mey., 349.
dentata Dor. var. subcapitata Skv. and Mey. fo. curta Skv. and Mey., 349.
geminata, 297, 300.
geminata (Lyngb.) M. Schmidt fo. curta Skv. and Mey., 350, 351.
geminata Skv. and Mey. fo. curta Skv. and Mey., 350.
geminata (Lyngb.) M. Schmidt fo. elongata Skv. and Mey., 350, 351.
geminata (Lyngb.) M. Schmidt var. baikalensis Skv. and Mey., 351.
geminata M. Schmidt var. curvata Skv. and Mey., 350.
geminata var. Doroszestzky Skv. and Mey., 349.
geminata var. genuina Skv. and Mey. fo. baicalensis Skv. and Mey., 350.
geminata (Lyngb.) M. Schmidt var. sibirica Grun., 349, 350.
geminata (Lyngb.) M. Schmidt var. sibirica Grun. fo. anomala Skv. and Mey., 350.
geminata var. sibirica Grun. fo. curta Skv. and Mey., 349.
geminata (Lyngb.) M. Schmidt var. sibirica Grun. fo. curvata Skv., 350.
geminata var. sibirica Grun. fo. elongata Skv. and Mey., 349.
geminata var. sibirica Grun. fo. genuina Skv. and Mey., 349.
geminata (Lyngb.) M. Schmidt var. sibirica Grun. fo. subcapitata Skv., 350.
geminata (Lyngb.) M. Schmidt var. stricta M. Schmidt, 351.
geminata (Lyngb.) M. Schmidt, var. stricta M. Schmidt fo. baicalensis Skv. and Mey., 351.
geminata (Lynch.) M. Schmidt var. stricta M. Schmidt fo. capitata Skv. and Mey., 351.
geminata (Lyngb.) M. Schmidt var. stricta M. Schmidt fo. curvata Skv., 351.
sibirica (Grun.) M. Schmidt, 349.
Diaphoropus, 468.
Dilar corsicus, 277.
harmandi, 276.
marmoratus, 276.
nietneri, 276.
taiwanensis Banks, 276.
(Nepal) formosanus Okam. and Kuwayama, 275.
Dilaridae, 276.
Dilepididae Fuhrmann, 493.
Diogenes Dana, 474, 604.
avarus Ulle., 604.
brevirostris Stimpson, 604.
lanaris Yaichiongco, 604.
Dione de Haan, 566.
Dioxhis Clere, 431.
acuminata Clere, 451.
nyrosa Yamauti, 121.
vinayana Tubangui and Masilungan, 431, 435.
Dioxippe de Haan, 546.
Diplogaster nimia Drake, 11.
nubila Drake, 11.
Diplogenyhus Horvath, 10.
carusi Horvath, 10.
kreuzi Kby., 10.
hewitti Dist., 10.
Diplonela baikalensis Skv. and Mey., 295, 323.
boldtiana Cleve, 321.
boldtiana Cleve var. baikalensis Skv., 295, 321.
dombittensis (Grun.) Cleve, 295, 320, 321.
dombittensis (Grun.) Cleve var. baikalensis Skv., 295, 320.
elliptica Cleve var. baikalensis Skv. and Mey., 323.
elliptica Cleve var. grossepunctata Pant., 321.
elliptica (Kütz.) Cleve var. ladogensis Cleve, 320, 295, 321.
lata Skv., 295, 323.
lata Skv. var. minuta Skv., 323.
lata Skv. var. punctata Skv., 323.
marginestriata Hust. var. nipponica Skv., 295, 322.
meyeri Brun, var. baicalensis Skv. and Mey., 323.
meyeri Brun, var. borussica Cleve fo. baicalensis Skv. and Mey., 335.
meyeri Skv., 295, 321.

Diplocnia—Continued.
oculata (Breb.) Cleve, 190.
ovalis (Hilse) Cleve, 198, 209, 320.
ovalis (Hilse) Cleve var. nipponica Skv., 299, 320.
ovalis (Hilse) Cleve var. oblongella (Naeg.) Cleve, 198, 329.
pseudovalis Hust., 322.
punctata (Schum.) Cleve, 199, 209, 321.
punctata (Schum.) Cleve var. baikalensis Skv., 299, 321.
smithii (Breb.) Cleve var. nipponica Skv., 159.
subovalis Cleve, 322.
subovalis Cleve var. baikalensis Skv., 301, 322.
turgida Skv., 299, 322.
turgida Skv. var. bipunctata Skv., 299, 323.
Diplomonidæ, 196.
Diplozoonida, 186.
amphacanthi Tubangui and Masilungan, 183-185.
amphacanthi in a marine fish, 183.
Diptera, 21, 143.
Dipylchus spinimarginatus Henderson, 499.
Discoplax longipes, A. M. Edw., 511.
Dorippidæ Grun., 353.
Distichon, 287.
dives, 287.
parvulus Okam., 287.
Dorippe F., 475, 514.
quadridens F., 514.
Doripsidæ Dana, 475, 514, 540.
Dromiopsis Spence Bate, 468, 472, 494.
reflexus Spence Bate, 494.
DRAKE, C. J., and M. F. D'OHR. Tingitidæ from Malaysia and Madagascar (Hemiptera), 1.
Drepanophallidæ, 204.
Dromia F., 475, 510.
vezzanensis White, 510.
(Cryptodromia) tuberculata Alcock, 510.
(Cryptodromia) tuberculata Stimpson, 510.
Dromiacea, 509.
Dromiidæ, 475, 509, 510.
Dromidea, 475, 509, 510.
Dulichia conchatus Dist., 18.
Dybowskiana baicalensis, 294.
Dynomidæ, 509.
Dypsocus lappaensis Okam., 261.

E

Ectopocus cryptomeriæ End., 267.
Ebalia falax Henderson, 514.
Ebaliana Stimpson, 514.
Echinoplax Miers, 477, 550.
meulenyi Miers, 550.
Edible birds' nest industry in Bacuit, Palawan, 379.
Elamena Leach, 477, 554.
arachnoides M. Edw., 554.
arachnoides (Rumph.), 554.
herbstii M. Edw., 554.
indica Leach, 554.
lamarcki M. Edw., 554.
Eleocaxina, 471.
Eriphia scabroides Rich., 284.
Etaphocenia, 470.
Eumorphognathus Fleber, 10.
Eumorphognathus Kby., 10, 11.
Roberti Stål, 11.
heffneri Fleber, 10, 11.
hewitti Dist., 10.
insulatus Drake, 10.
papuiensis Dist., 10.
Eumunnidus A. M. Edw., 471, 474, 499.
debilis Henderson, 499.
Euplocrolides Decker, 177.
Eurycnema ventricosum, 206.
Eurycus, 471.
Epicarcinus cumpletus Banks, 268.
delicatus Hasen, 268.
fuscofasciatus Endl., 267.
hagenii Banks, 256.
marginatus Endl., 266.
subtilipennis Karsch, 265, 267.
Epicharon haleakalæ Sara, 294.
Epithemia, 300.
argus Kütz. var. alpestris W. Sm., 211.
gibba, 296.
intermedia Fricke, 355.
porcellus, 296.
turgida var. genuina, 296.
turgida (Ehr.) Kütz. var. granulata (Ehr.) Grun., 356.
zebra (Ehr.) Kütz., 211, 355.
zebra var. genuina, 296.
zebra (Ehr.) Kütz. var. porcellus (Kütz.) Grun., 211.
zebra (Ehr.) Kütz. var. saxonica, 295.
Epixanthus Hlbr., 475, 528.
dentatus Miers, 528.
dentatus (White), 528.
frontalis Hlbr., 529.
frontalis (M. Edw.), 529.
Epotomeavis, 469.
Eriocera Macq., 152, 153, 166, 158, 160, 162, 163.
assumensis Edw., 163.

Erioeera—Continued.
bengalensis Alex., 160.
bicolor Macq., 160.
cinzulata de Melj., 160, 178.
fasciata de Melj., 173.
ferruginosa van der Wulp, 168.
hornyi Edw., 153.
mesochyrrha (Wied.), 160.
pennlata Endl., 166.
selene Edw., 170.
selene O., S., 170.
Eriocnemini, 176.
Eriphia Latr., 476, 630.
gonagra Krauss, 630.
laevimana Latr., 630.
laevimana M. Edw., 630.
scabricula Dana, 630.
spinifrons (Herbst.), 630.
spinifrons M. Edw., 630.
trapeziformis Hess, 630.
Eriphiinae, 622, 630, 631.
Eriphioida, 630.
Eryon, 470.
Eryonastacus, 470.
Eryonicus, 470.
Eryonidae, 470, 472, 497.
ESTAMPADOR, EULOGIO P., A check list of Philippine crustacean decapods, 468.
Etisus dilatus Dist., 13.
angilatus Drake and Poor, 13.
asperus Drake and Poor, 12.
virtalis Drake and Poor, 13.
vixendus Drake and Poor, 14.
Ethusa Roux, 475, 514.
gracilipes Miers, 514.
(Ethusira) gracilipes Miers, 514.
Etisinae Ortmann, 526.
Etisodes Dana, 475, 526.
anaglyptus Haswell, 526.
anaglyptus M. Edw., 526.
Etisus M. Edw., 475, 526.
laevimanus Randall, 526.
utilis Lucas, 526.
Eucalimacia badia Okam., 288.
taenilensis, 288.
Eucrossorhis baikalensis Skv., 302, 311.
crossensis Wisl. and Kolbe, 295, 311.
Eucyphi, 470.
Eucyphidae, 470.
Eucyroneta pretatum Rafn, 208.
Eumastaspa taiwanensis Kuwayama, 288.
Eumedonidae Ortmann, 478, 559.
Eumedoninae Miers, 557, 559.
Eunotia bidens var. dybowskii, 296.
clevei Grun., 302, 309, 310.
clevei Grun. var. baikalensis Skv., 310.
clevei Grun. var. bispida Skv., 310.
clevei Grun. var. undea Skv., 309.
dodon, 298.
flexuosa Kütz., 194.
lapus baikalli Skv., 300, 310.
papilio, 295.
Eunotia—Continued.
praerupta Ehr., 298, 309.
praerupta Ehr. var. inflata Grun., 298, 309.
subarcuatodon Hust., 309, 309.
tenella (Grun.) Hust., 194.
Eupagurus Brandt, 474, 605.
Janitor Alcock, 605.
spinulentus Henderson, 605.
Euphausiidae, 470.
Euruppellia virosa de Man, 529.
Euralia Weber, 618.
Eurylidae Rathbun, 510.

F

Fejaopus formosanus, 257.
Fibribranchiata Boulenger, 307.
Fish, marine, parasite of, 193.
Formicaleo formosanus Okam., 257.
Formosita hatakeyamae Okam., 272.
Frasilaria capucina, 296.
construens (Ehr.) Grun. var. venter (Ehr.) Grun., 193.
lapus baikalli Skv., 300, 307.
mutabilis Grun. var. baicalensis Skv. and Mey., 307.
mutabilis Grun. var. subsalsa Skv. and Mey., 307.
pinnata Ehr., 298, 307.
pinnata Ehr. var. baikalensis Skv., 298, 307.
robusta Hust., 309, 307.
spinosa Skv., 300, 307, 308.
virescens, 296.
Frustulia rhomboides (Ehr.) de Toni var. amphipleuroides Grun., 196.
rhomboides (Ehr.) de Toni var. amphipleuroides Grun., 299, 313.
rhomboides (Ehr.) de Toni var. saxonica (Rabh.) de Toni fo. capitata A. Mayer, 196.
vulgaris Thw., 196.
Fulvius rhombifer Tsens., 430.
clevei Tseng, 439, 435.

G

Galathea E., 471, 474, 498, 508.
acutata Haswell, 498.
elegans White, 454.
rostrirostris Stimpson, 498.
subsquamata Stimpson, 498.
Galatheidae Dana, 471, 474, 498, 508.
Galatheoidea, 506.
Galathopsis debilis Henderson, 498.
Galenius (Arcuellus) orbitalis Horvath, 12.
Galliformes, 426.
Gallinago megala, 433.
Gallinula chloropus, 432.
Gallus gallus de Hapn, 417, 515.
Gama, 287.
matsuokae Okam., 287.

Gnoriosyrus pulex, 296.
GARCIA, EUSEBIO Y., see ARRIBA, LEON, and GARCIA; see also RIBEIRO and GARCIA.
Gebia Leach, 471, 474, 490.
barbata Strahl, 490.
Geocarcinidæ Dana, 541.
Geocarcinus Leach, 476, 541.
ruricola Leach, 541.
ruricola (Linn.) 541.
Geocrecidea M. Edw., 476, 541.
Islandii M. Edw., 541.
Gelasimus Latr., 542.
acutus Alcock, 543.
annulipes Miers, 542.
arcuatus Miers, 543.
cantonis M. Edw., 542.
coarctatus de Man, 542.
cultrimanus Kingsley, 545.
cultrimanus White, 544.
dussumieri Alcock, 543.
forcipatus de Man, 544.
latvillei Kingsley, 545.
longidigitum Kingsley, 545.
marionis Alcock, 544.
marionis var. nitida Alcock, 544.
nitidus Dana, 544.
perplexus Hilg., 543.
rubripes M. Edw., 545.
signatus Haswell, 543
tetragonum Alcock, 543.
triangularis Alcock, 543.
urvillei M. Edw., 544.
vocans M. Edw., 544.
vocans Miers, 545.
vocator Kingsley, 544.
Gennadas Spence Bate, 470, 473, 494.
parvus Spence Bate, 494.
Geocarcinidæ, 476.
Geograpsus Stimpson, 476, 536.
lividus (M. Edw.), 536.
lividus Rathbun, 536.
occidentalis Stimpson, 536.
Geology of Puerto Galera, Mindoro, 239.
Glaucon, 296.
Glaucothoides okinawensis Okuno., 237.
Glyphocrangon, 468.
Gnathograpsus barbatus A. M. Edw., 540.
Golomanka, 293.
Gonerbiridæ, 293.
Gomeza Gray, 476, 516.
bicornis Gray, 516.
vicinitispinosa A. M. Edw., 516.
Gomphonota elegans Grun., 352.
herculeanum Ehrenb., 353.
Gomphonema, 298.
acuminatum Ehr. var. coronata (Ehr.) W. Sm., 300.
acuminatum var. coronatum, 296.
angustatum, 296.
augur Ehr. var. gautieri Van Heurck, 209, 210.
Gomphonema—Continued.
augur Ehr. var. okamurae Skv., 269.
bohemicum, 210.
capitatum, 296.
constrictum Ehr. var. capitata (Ehr.) Cleve, 210.
delicatula Skv., 300, 354.
delicatula Skv. var. bipunctata Skv., 354.
dentata Bor., 297, 349.
dichotomum, 296.
elegans Grun. var. quadripunctata Skv., and Mey., 352.
eriense Grun. var. balcalensis Skv. and Mey., 354.
firma Skv., 300, 353.
fusum, 296.
geminatum Lyngb. var. hybrida Grun., 349.
globiferum Meister, 210.
ilvana Skv., 210.
innata Skv., 300, 352.
innata var. elegans, 300.
intricatum Kütz., 210, 295, 300.
intricatum Kütz. var. minor Skv., 353.
intricatum Kütz. var. pumila Grun., 353.
irrata Skv. var. elegans Skv., 353.
lanceolatum Ehr., 54.
lanceolatum Ehr. var. capitata Skv., 300, 354.
lineata Skv., 214.
olivaceum (Lyngb.) Kütz., 296, 300, 352.
olivaceum Kütz. var. quadripunctata Oestr., 351.
pomeranicum Grun., 211.
quadripunctatum (Oestr.) Wisl., 297, 300, 351, 352.
quadripunctatum (Oestr.) Wisl. fo. tumida Skv. and Mey., 351.
quadripunctatum (Oestr.) Wisl. var. genuina Skv. and Mey., 351.
quadripunctatum (Oestr.) Wisl. var. genuina Skv. and Mey. fo. robusta Skv. and Mey., 352.
quadripunctatum (Oestr.) Wisl. var. hastata Wisl., 297, 352.
quadripunctatum (Oestr.) Wisl. var. hastata Wisl fo. curta Skv. and Mey., 352.
vastum Host. var. maxima Skv., 210.
ventricosum Ehr., 300, 354.
ventricosum Ehr. var. ornata Grun., 354.
ventricosum Grun., 353, 354.
Gonoplacidæ, 476.
Goneplacinæ, 534.
Goneplax Leach, 476, 534.
rencinda Rathbun, 534.

Goniopsis strigosus de Haan, 535.
Goniosoma A. M. Edw., 517.
anisodon A. M. Edw., 518.
crucifera A. M. Edw., 517.
halleri Henderson, 517.
mergueiensis de Man, 517.
miles A. M. Edw., 517.
natator A. M. Edw., 517.
ornatum A. M. Edw., 518.
Gonomyia Meig., 177.
nigra Brun., 178.
(Elipteroides) albocentralis (Röser), 177, 178.
(Elipteroides) atra Hutchens, 178.
(Elipteroides) atropollis Alex., 178.
(Elipteroides) brunnescens Edw., 178.
(Elipteroides) chaeta Egg., 177.
(Elipteroides) picea Becker, 177.
(Elipteroides) lateralis Macq., 177, 178.
(Elipteroides) limbata Röser, 177.
(Elipteroides) manifesta Walk., 177.
(Elipteroides) scutellata Egg., 177.
(Elipteroides) tenebrosa Edw., 178, 179.
(Elipteroides) terebrella Alex., 178.
(Protogonomyia) brevifurca Alex., 177.
(Protogonomyia) confluenta Alex., 178.
(Protogonomyia) cultellata Alex., 178, 180.
(Protogonomyia) flaveola Alex., 177.
(Protogonomyia) lenis Alex., 178, 179.
(Protogonomyia) natalensis Alex., 177.
(Protogonomyia) nigripes Brun., 178.
(Protogonomyia) nigrolimbo Alex., 177.
(Protogonomyia) perturbata Alex., 178.
(Protogonomyia) pulchrealma Alex., 177.
(Protogonomyia) scutellum-album Alex., 178.
(Protogonomyia) almorae Alex., 177.
gracilis Brun., 178.
incompleta Brun., 179.
Gonomyiella Alex., 177.
Gonoplacidae Dana, 523.
Goura coronata, 413.
Grapsidae, 476, 535.
Grapsinus MacLeay, 530.
Grapsoidea, 535.
Gravers Lam., 476, 535.
Kingsley, 476, 536.
depressus Rosch, 540.
gracilis Alcock, 537.
gracilis (Lam.), 535.
latifrons White, 535.
lividus M. Edw., 536.
natator M. Edw., 535.
ornatus M. Edw., 535.
strigosus (Herbst), 535.
strigosus Miers, 535.
(Goniopsis) pictus de Haan, 535.
(Pachysoma) Sidens de Haan, 538.
Grimothea, 471.
Grunowia (Rabh.) Grun, 358.
Gyrocelia Fuhrmanni, 434.
fausti, 435.
paradoxa Linstow, 434, 435.
Gyrosigma acuminatum (Kütz.) Rabh., 297.
acuminatum (Kütz.) Rabh. var. baikalensis Skv., 299, 314.
attenuatum Kütz. var. baicalensis Skv., 315.
baikalensis Skv., 300 315.
distorum, 300
distorum W. Sm. var. parkeri Harrison, 300, 316.
kützingii (Grun.) Cleve, 297.
spenceri var. nodifera, 299.
spencerii (W. Sm.) Cleve var. nodifera Grun., 315.
spencerii (W. Sm.) Cleve var. obsamosa Skv., 297.
spencerii (W. Sm.) Cleve var. smithii Grun., 297.

H

Hagenella formosana Banks, 265.
sonata Hagen, 267.
Hagenomyia nasalis Okam., 287.
brunneipennis Peters., 287.
micans, 287.
Halicarcinus Spence Bate, 470, 473, 494.
aequalis Spence Bate, 494.
laevis Spence Bate, 494.
Hantzschia amphioxys (Ehr.) Grun., 312.
amphioxys (Ehr.) Grun. var. vivax (Hantz.) Grun, 312.
Haplocarcinus Clere, 433, 435.
clerei Yamaguti, 432.
disciformis v. Linstow, 432.
sanjuanensis Tubangui and Masilungan, 432, 435.
Haplopodea, 469, 473, 491.
Harpacticella longipennata, 294.
Harrovia Adams and White, 476, 559.
albo-lineata Adams and White, 559.
Hectarthropidae, 468, 473, 491.
Hectarthropus Spence Bate, 469, 473, 491.
exilis Spence Bate, 491.
expansus Spence Bate, 491.
Hedrophthalmus thalamitoides Nauck, 519.
Helice de Haan, 476, 539.
latreillei M. Edw., 539.
Hemarthridae, 475.
Hemigrapsus, 279.
japonicus, 280.
spleniger us Danks, 279.
Hemicaecilius limbatus End., 265.
nigrosquitatus Karny, 265.
transversus Banks, 265.
Hemipenaeus Spence Bate, 470, 473, 493.
gracilis Spence Bate, 493.
spinodorsalis Spence Bate, 493.
tomentosus Spence Bate, 493.
viridis Spence Bate, 493.

Hemipsocus chlorotieus Hagen. 260.
Hemiptera, 1.
Heoclisis kawaii Nakahara, 288.
Hephthopelta Alcock, 470, 534.
apta Rathbun, 534.
Hepomalus, 470.
Heptapyla Philippi, 55.
albocannulata Strobl, 60.
cincticps Edw., 59.
eburnea Tokunaga, 60.
furida Garrett, 59.
nipponica Tokunaga, 58.
rugosa Saussure, 59.
Hetairus, 468.
Heterocarpus A. M. Edw., 468, 472, 483.
alphonsi Spence Bate, 483.
ensifer A. M. Edw., 483.
ensifer var. parvispina de Man, 483.
gibbosus Spence Bate, 485.
Heteroclitha Wood-Mason, 475, 514.
fallax (Henderson), 514.
fallax Laurie, 514.
Heteropanope dentatus Stimpson, 528.
Heterotachyidinis, 393.
Heteruphyra brevicosta, 393, 396.
Hexatoma Latr., 152.
constricta sunda Alex., 174.
ferruginosa, 155.
malakensis, 178.
(Eriocera) acromacula (Wied.), 163, 164.
(Eriocera) albifuscinta (van der Wulp), 165.
(Eriocera) argyrocephala Alex., 165, 169.
(Eriocera) atricornis Alex., 172.
(Eriocera) atriloma Alex., 168.
(Eriocera) aurantia Brun., 153.
(Eriocera) basifuria (Wied.), 165, 166, 169.
(Eriocera) bengalensis, 160.
(Eriocera) bezoalensis constricta Alex., 174.
(Eriocera) bicolor Macq., 174.
(Eriocera) caninota Alex., 156, 157.
(Eriocera) cingulata (de Meij.), 178.
(Eriocera) commoda Alex., 153.
(Eriocera) constricta Alex., 174.
(Eriocera) dirhoa, 153.
(Eriocera) diengensis Alex., 173.
(Eriocera) ferruginosa (van der Wulp), 155, 154.
(Eriocera) flavohirta Alex., 169.
(Eriocera) indecora Alex., 157.
(Eriocera) interstitialis Alex., 165, 168, 169.
(Eriocera) javensis Dol., 163.
(Eriocera) karnyi Edw., 153.
(Eriocera) lunigera (Walk.), 174, 175.
(Eriocera) lygropis Alex., 156.
(Eriocera) malayensis Alex., 172, 176.
(Eriocera) malevolens Alex., 165.
(Eriocera) mesopyrrha (Wied.), 159.
Hexatoma—Continued.
(Eriocera) multicolor Alex., 160.
(Eriocera) nepalensis, 162.
(Eriocera) novella Alex., 162.
(Eriocera) punctata Endl., 155.
(Eriocera) punctosa (Endl.), 166.
(Eriocera) plumbolutea Edw., 161.
(Eriocera) plutonis Alex., 155, 157.
(Eriocera) rubrescens, 152.
(Eriocera) sabahensis Edw., 172, 173.
(Eriocera) sclerie O. S., 170, 173.
(Eriocera) semilunata Alex., 171.
(Eriocera) subaurantia Alex., 152.
(Eriocera) sublunigera Alex., 174.
(Eriocera) toxopei Alex., 172.
(Eriocera) umbripennis Edw., 163.
(Eriocera) verticalis Wied., 155.
(Eriocera) vidua Alex., 158, 160.
Hexatomini, 151.
Hipon, 219.
Hippa adactyla F., 508.
symmista F., 509.
Hippidae Dana, 474, 508, 511.
Hippidea, 474, 508.
Hippolyte, 469.
Hippolytidae, 468, 472, 543.
Holophygadon Kirk., 18.
artocarpi Horvath, 18.
melanesica Kirk., 18.
neocaledonica Drake, 18.
philippinensis Drake, 18.
Homaridae, 471, 473, 497.
Homarus, 471.
Homolidae, 474, 509, 510.
Homolodromidae, 509.
Hoplophoridae, 490.
Hoplophorus H. M. Edw., 487.
typus Bate, 487.
Hoplophoridae de Man, 487.
Hoploxanthus, 517.
Hormilidas pictus Dana, 18.
vicarius Drake, 18.
Hornia de Haan, 477, 551.
pruinosa de Haan, 551.
Hyastenus White, 472, 552, 564.
auctus Rathbun, 562.
biformis Rathbun, 565.
diacanthus A. M. Edw., 563.
diacanthus (de Haan), 553.
elegans Miers, 553.
fenteroulus Rathbun, 553.
orbis Rathbun, 553.
oryx A. M. Edw., 553.
scrobiculatus Rathbun, 553.
sebae Adams and White, 553.
sebae White, 553.
tinaktensis Rathbun, 553.
triapinensis Rathbun, 552.
tuberculosus Rathbun, 552.
Hylaeaxelinus hunei Wood-Mason, 541.

Hymenodora G. O. Sars, 469, 472, 490.
glauca Spence Bate, 490.
rostrata Spence Bate, 490.
Hymenolepididæ Railliet and Henry, 427.
Hymenolepis Weinland, 427–429, 435.
coronoidis Tubangui and Masilungan, 427, 428, 435.
fasciminosa Corso, 427, 428.
planestici Mayhew, 428, 429.
pycnonoti Tubangui and Masilungan, 428, 436.
sp., 430.

I

Iaccus Leach, 470, 473, 495.
ciliatus v. Sieb., 495.
vrrill Spence Bate, 495.
Isotopus, 469.
Illinæ, 532.
Iloko cart, 86.
construction, 91.
house, 87.
vocabulary, 87.
Inachidæ, 477, 549, 552, 555.
Inachinæ, 549.
Inachus F., 477, 549.
arabicus Rupp, 551.
forcipa Adams and White, 549.
Infusoria, 294.
Insects, neuropteroid, 255.
Iole sularis, 480, 495.
Iphiculus Adams and White, 457, 513.
spongicolus Adams and White, 513.
Iron in anopheline ecology, 125.
Isopleurey, 256.
decipiens Banks, 256.
pallatus Hagen, 257.
Isoptatus Akuse, 42.
Ixa Leach, 475, 518.
cylindricus var. megaspis Adams and White, 513.

J

JESUS, P. I. DE, Physicochemical factors in Anopheline ecology, II: Studies on turbidity, chloride, and iron, 125.

K

Kamipuria formosana Okam., 269.
Kathmopteris, 271.
KEDROWSKY, W. I., Variations in the actinomycetes, in connection with the theory of the mycotic nature of the viruses of tuberculosis and leprosy, 439.
Klotina lucida Klap., 272.
Kolenatius brevicornis Okam., 268.
Kolbea fusconervosa End., 261.
serialis Banks, 261.
Kowalewskiella Bacsynska, 433.
bonnardi Tubangui and Masilungan, 433, 435.
Kuyua, 229.
Kyptocaris Spence Bate, 468, 472, 484.
stylofrontalis Spence Bate, 484.

L

Lambrus Leach, 478, 557.
affinis A. M. Edw., 558.
contrarius (Herbst.), 558.
contrarius M. Edw., 558.
interruptus Miers, 557.
lamellifrons Adams and White, 558.
longimanus Leach, 558.
longimanus (Linn.), 558.
pelagicus Rupp., 558.
pinnidis Adams and White, 558.
pinnotheres Miers, 558.
serratus M. Edw., 558.
turriger White, 558.
(Parthenolambrus) catappoides (Adams and White), 558.
(Parthenolambrus) catappoides Miers, 558.
Laminibranchiata, 560.
Lancelotia Grun., 326.
Latreillia Roux, 474, 510.
valida de Haan, 510.
Latreilliidæ, 474, 509, 510.
Latreillopsis Henderson, 474, 510.
bispinosa Henderson, 510.
Latreutes Stimpson, 469, 472, 483.
planus Spence Bate, 483.
unidentatus Spence Bate, 483.
Leiolephus planissimus Miers, 540.
LEON, WALFRIDO DE, *see* AFRICA, LEON, and CADIZ.
Lepium chrysochlora, 265.
enderleini Banks, 265.
Leprosy, variations in the actinomycetes in connection with the theory of the mycotic nature of the viruses of tuberculosis and, 439.
Leptochela Stimpson, 469, 473, 491.
robusta Spence Bate, 491.
robusta Stimpson, 491.
Leptolius A. M. Edw., 476, 526.
cavipes de Man, 526.
evansius A. M. Edw., 526.
serratus var. sanguineus Miers, 526.
nodipes A. M. Edw., 526.
Leptomithrax Miers, 477, 552, 555.
sinensis Rathbun, 555.
Leptomya Lam., 554.
Leptopha capitata Kirkbuhenko, 12.
hospita Drake and Poor, 12.
Lesser sand plover, 484.
Leucosia F., 476, 511.
affinis Bell, 512.
australiensis Miers, 511.
brevimana Bell, 512.
craniolaris F., 511.
craniolaris (Linn.), 511.
cuninghi Bell, 511.

Leucosia—Continued.
fusca F., 512.
haswelli Miers, 511.
marmorea Bell, 512.
marmorea Ihle, 512.
pallida Bell, 512.
parvimana Stimpson, 512.
perlata de Haan, 512.
punctata Bell, 511.
Leucosiidæ, 433, 510, 511, 559.
Leucosiidæ, 511.
Leucosiinæ Miers, 511.
Libinotes, 145, 149.
subfamiliaris Alex., 148.
Lichtensteinipicus funebris, 449.
Limnobia aerostreta Wied., 162.
basilaris Wied., 155.
mesopyrrha Wied., 159.
Limnocarcinus intermedius de Man, 541.
Limonia (Libnotes) claudo Alex., 148.
(Libnotes) intelthorax Alex., 147, 149.
(Pseudoglochina) angustiplicatis Alex., 150.
(Pseudoglochina) kobusi de Meij., 151.
(Pseudoglochina) querula Alex., 149, 150.
(Pseudoglochina) unicincticipes Alex., 150.
Limoniinæ, 147.
Limoniini, 147.
Limuparia, 470.
Liomera Dana, 476, 523.
cinctimana Dana, 523.
cinctimana (White), 523.
Lissocarcinus Adams and White, 475, 522.
bobolensis Miers, 522.
bobolensis Semper and Navek, 522.
levis Miers, 522.
Locon, 219.
Lophactea A. M. Edw., 476, 523.
granulosa Ortmann, 524.
granulosa (Rump.), 525.
Lophogastridæ, 470.
Lophopanopeus Rathbun, 476, 526.
bellus Rathbun, 524.
bellus (Stimpson), 524.
frontalis Rathbun, 524.
Lophoptergoda cameliua End., 255.
Lophoxanthus bellus A. M. Edw., 524.
frontalis Holmes, 524.
Lophoxyrnus A. M. Edw., 476, 526.
(Lophoxanthus) bellus Miers, 524.
Lophoxanthus) frontalis Rathbun, 524.
octodentatus Alcock, 523.
octodentatus (M. Edw.), 523.
Lubbockiidæ, 294.
Lucifer, 470, 473.
pacificus Dana, 494.
reynaudii M. Edw., 495.
typus Thompson, 494.
vaughan Thompson, 494.
Luciferinæ, 470, 494.
Lupa granulata M. Edw., 521.
Lupinæ Alcock, 517.

M

Macrochelopus brauckii Dyb., 294.
Macropodopia Thielemann, 84.
Macrophthalmina Dana, 545.
Macrophthalmus Latr., 476, 545.
crinitus Rathbun, 545.
definitus Ortmann, 545.
definitus White, 545.
japonicus de Haan, 545.
Mirellei (Desmarest), 545.
Intreillei M. Edw., 546.
pacificus Rathbun, 546.
sandakani Rathbun, 546.
serratus Adams and White, 546.
sp., 546.
Macrura, 466-468, 473-474, 479, 492, 506, 508, 509.
Maia, 477, 552.
Maiidæ Miers, 477, 549, 552, 555.
Maiinæ Miers, 552.
Maifnæ, 549.
Maioidea, 549.
Maja, 555.
bisarmata Rathbun, 555.
linaçaensis Rathbun, 555.
sulcosa Rathbun, 555.
Malacomysa pulverulenta End., 277.
Malaga, 229.
Malleus alternatus, 285.
MANACOP, PORFIRIO R., The artificial fertilization of dangit, Amphacanthus oramin (Bloch and Schneider) Amphacanthidæ, 229.
Manajunkia baikalensis, 294.
Mantisina formosana Okam., 259.
orientalis B. Peterm., 259.
tenuaversa Stitz, 259.
Mantispidæ, 258.
Mantispilla, 259.
apicinota, 259.
MANUEL, CANUTO G., Beneficial swiftlet and edible birds' nest industry in Bacuit, Palawan, 379.
MASILUNGAN, VICTORIA A., see TOMANGCI and MASILUNGAN.
Mastigochirus Stimpson, 474, 502.
quadrilobatus Miers, 502.
Mastogloia elliptica Agardh var. danseï (Thwaites) Grun., 186.
elliptica var. danseï, 191.
Matsumuraiella enderleini Ranke, 269.
radiopicta End., 260.
Matuta F., 475, 515.
banksii Leach, 515.
banksii Miers, 516.
lunaris Forsk., 516.
lunaris Stebbing, 516.
maculata Miers, 516.
obtusifrons Miers, 516.

Matuta—Continued.
pieta Miers, 516.
victor F., 515.
victrix F., 515.
victrex Miers, 515.
victrix + crebrepunctata de Man, 516.
victrix — maculata de Man, 516.
Matutidae, 475, 515.
Menaethius, 279.
formosanus Banks, 279.
hirtus, 279.
Menippe, 468, 469, 471.
Megistocera verticalis Wied., 165.
Melaira globigna (Grun.) O. Müll. status Y, 193.
cronaria Moore, 296, 304.
arenaria Moore var. baikalensis Skv., 294, 304.
arenaria Moore var. baikalensis fo. ornata Skv., 304.
arenaria Moore var. baikalensis fo. punctata Skv., 304.
baicalensis (K. Mey.) Wisl., 302.
baikalensis (Mey.) Wisl., 294, 297, 300, 302.
baikalensis (K. Mey.) Wisl. fo. compacta Skv., 303.
baikalensis K. Mey. fo. minuta Skv., 305.
baikalensis (K. Mey.) Wisl. fo. oblongopunctata Skv., 305.
baikalensis K. Mey. fo. ornata Skv., 305.
baikalensis K. Mey. fo. stellata Skv., 305.
baikalensis (K. Mey.) Wisl. fo. typica Skv., 305.
binderana Kütz., 303.
granulata, 296.
hyalina, 296.
islandica O. Müll. subsp. helvetica O. Müll., 192.
islandica O. Müll. var. baicalensis K. Mey., 297, 302.
italica, 295.
italica (Ehr.) Kütz. var. valida Grun., 291.
polymorpha Bethge subsp. granulata (Ralfs) Bethge var. baicalensis (Wisl.) Bethge, 302.
scalprata Oestr., 304.
subflexilis, 296.
tenuis, 296.
undulata (Ehr.) Kütz., 192.
Menaethius M. Edw., 477, 551.
angustus Dana, 551.
arcuatus Dana, 551.
dentatus Stimpson, 551.
depressus Dana, 551.
inornatus Dana, 551.
monoceros (Latr.), 551.
monoceros M. Edw., 551.
morrellus White, 551.
subserratus Adams and White, 551.
subserratus Dana, 551.
Menippe de Haan, 476, 528.
convexa Rathbun, 528.
Menippidae, 522, 528.
Menippinida, 528.
Mepleres, 265.
Meridion circulare, 296.
Morphippolyte, 468
Mesocoecilus quadrimaculatus Okam., 265.
Mesoperla cruciger Klap., 272.
Metanauplius, 470.
Metapenaeus affinis Alcock, 222.
rectacutus, 493.
Metaxanthus M. Edw., 476, 535.
rousseauxi de Man, 536.
rousseauxi M. Edw., 536.
Metopograpsus M. Edw., 476, 535.
latifrons M. M. Edw., 535.
latifrons (White), 535.
maculatus M. M. Edw., 536.
messor Alcock, 535.
messor (Forsk.), 536.
pictus de Man, 535.
Micippa Leach, 477, 555.
bicarinata Adams and White, 556.
cristata (Linn.), 555.
cristata M. Edw., 555.
hirtipes Dana, 556.
philyra (Herbst), 555.
philyra M. Edw., 556.
Micippidae Miers, 555.
Miersenus novitus Nevas, 280.
smitti E. Petersen, 280.
Micrauchenia Thienemann, 42.
Microrhynchina, 562.
Mictyridae Dana, 548.
Mictyris Latr., 548.
brevidactylus Stimpson, 548.
deflexifrons de Haan, 548.
longicarpus Latr., 548.
platycheles M. Edw., 548.
subverrucatus White, 549.
Mithraculus Stimpson, 556.
Mitrax Leach, 477, 556.
dichotomus Desmarest, 556.
dichotomus Latr., 556.
Modiola philippinarum, 546.
Mollusca, 294.
Monolidae, 509.
Monanthia dentata Fieber, 15.
crenata Fieber, 15.
lituuides Motsch., 6.
(Physatocheila) sordida Stål, 8.
Monocarpidea, 468, 469, 472, 473, 484.
Monochidrema bailukoi, 393, 396.
Munida Leach, 471, 474, 498.
curvirostris Henderson, 498.
inerta Henderson, 499.
militaris var. curvirostris Henderson, 498.
Munidopsis Whiteaves, 471, 474, 498.
milleri Henderson, 498.
pilosa Henderson, 499.

Mycobacterium, 444.
Myctiridæ, 477.
Myctiris, 477.
Myra Leach, 475, 512.
carinata Bell, 513.
darnleyensis Haswell, 513.
eudactyla A. M. Edw., 513.
fugax (F.), 512.
fugax Leach, 512.
kesteri Ihle, 513.
punctata Herbst, 510.
Myrmecocystus, 297.
Myrmedon formicarius, 287.
ochraceopennis Nakahara, 287.
punctiventris Banks, 287.
Myrmoleonidæ, 286.
Myrodes Bell, 475, 513.
eudactylus Bell, 513.
virus Haswell, 513.
Mysidæ, 470.
Mytilus, 547.

N

Nectura matsumuræ Okam., 280.
Nauplius, 470.
Nautravis, 468.
Navicula Bory, 298, 324.
acuta Skv., 299, 335.
americana Ehr., 299, 324.
amphibola Cleve, 336, 337.
amphibola Cleve var. curta Skv., 299, 337.
anglica Ralfs, 302, 299, 332.
anglica Ralfs var. subsalsa Grun., 302, 332.
annulata Grun., 334.
annulata Grun. var. baikalensis Skv., 301, 333.
antiqua Skv., 301, 326, 327.
appendiculata, 295.
argenea Skv., 299, 324.
atomarius Skv., 302.
atomus (Nägeli) Grun., 299, 326.
bacillares Cleve, 324.
bacillum Ehr., 299, 324.
binodis, 295.
cardinalis, 296.
cincta (Ehr.) Kütz., 327.
elongata Skv., 301, 327.
clausii, 191.
coccoconiformis, 295.
confervacea Kütz. var. baikalensis Skv., 301, 324.
costulata Grun., 299, 327.
costulata Grun. var. baikalensis Skv., 327.
costuloides Skv., 299, 327.
crucicula (W. Sm.) Donkin var. obtusata Grun., 302, 326.
cryptocephala Kütz., 295, 299, 327.
cryptocephala Kütz. var. exilis (Kütz.) Grun., 327.
Navicula—Continued.
cryptocephala Kütz. var. veneta (Kütz.) Grun., 327.
cuspidata Kutz., 299, 299, 324.
cymbula Donkin, 328.
dahurica Skv., 299, 337.
decipientes Cleve, 325.
delicatula Skv., 299, 302, 326, 336.
dennestriata Hust., 326.
disjuncta Hust., 324.
elliptica, 296.
exilis (Greg.) O. Müll., 293, 299, 332.
falaisensis Grun. var. lanceola Grun., 302.
firma var. major, 295.
fluens, 299.
fluens Hust. var. baikalensis Skv., 325.
fluens Hust. var. subcostata Skv., 325.
frustulum var. perpusilla, 191.
gastrum Ehr., 302, 299, 320.
gastrum var. jenisseyensis Grun., 333.
globulifera Hust. var. nipponica Skv., 293.
gracilis Ehr., 299, 328, 320.
granulata, 302.
granulifera Skv., 334.
halophila var., 191.
halophila (Grun.) Cleve var. okamurae Skv., 300.
hasta, Pant., 299, 329.
hasta Pant. fo. minor Skv., 293.
Hauerii Grun., 301, 331.
Heufleri Grun., 317.
Heribaudii Perag., 317.
heterostriata Cleve, 325.
hungarica Grun. var. capitata (Ehr.) Cleve, 292.
Hustedtii Krasske, 324.
ikarl Skv. var. nipponica Skv., 293.
Kolbei Pant., 302, 320.
lacus baikali Skv. and Mey., 301, 331.
lacus baikali Skv. and Mey. var. baikalensis, 331.
lacus baikali Skv. and Mey. var. lanceolata Skv., 331.
lacus baikali Skv. and Mey. var. simplex Skv. and Mey., 331.
lacustris Greg., 299, 336.
lacustris Greg. var. baikalensis Skv., 336.
lacustris Greg. var. elongata Skv. and Mey., 336.
lanceolata (Agardh) Kütz., 292, 299, 328.
lanceolata (Agardh) Kütz. var. cymbula (Donkin) Cleve, 328.
lanceolata (Agardh) Kütz. var. tenuirostris Skv., 328.
lata fo. major, 297.
leviscima, 296.
linuma var. truncata, 295.
lineolata Cleve, 327.
maculolnoides Hust., 301, 326.

Navicula—Continued.
magna Skv., 301, 329.
magna Skv. var. carta Skv., 330.
magna Skv. var. lanceolata Skv., 330.
membranula Schum., 299, 334.
mesoleiae Cleve, 324.
meyeri Skv., 299, 332.
minima Grun., 293.
minima Grun. var. okamurae Skv., 293.
minuscula Cleve, 326.
mutica Kütz., 291.
orthostichae Cleve, 324.
paradoxa Skv., 302, 334.
pelagica, 295.
peregrina Ehr., 330.
peregrina (Ehr.) Kütz., 330.
peregrina (Ehr.) Kütz. var. kefvingensis (Ehr.) Cleve, 302, 331.
Phi Cleve, 301, 331.
placentula (Ehr.) Grun., 299, 333.
placentula (Ehr.) Grun. fo. jeniseyensis (Grun.) Meister, 333.
placentula (Ehr.) Cleve fo. rostrata A. Mey., 333.
prodaria, 295.
pseudotarilis Skv., 299, 329.
pumila W. Sm., 287.
pupula, 296, 299.
pupula Kütz. var. baikalensis Skv., 325.
pupula Kütz. var. capitata Hust., 291, 325.
pupula Kütz. var. elliptica Hust., 291.
pupula Kütz. var. rectangularis (Greg.) Grun., 291, 325.
quarnerensis, 295.
radiosa Kütz, 302.
radiosa Kütz. fo. nipponica Skv., 302.
rhynchocephala Kütz., 291, 299, 328.
rhynchocephala var. brevis, 295.
rhynchocephala var. dubia, 295.
rhynchocephala Kütz. var. tenuis Skv., 328.
rostellata Kütz., 291, 299, 329.
rostellum, 295.
Schultzii Kain., 336.
Schultzii Kain. var. californica Cleve, 336.
scoliopleuroides Quint, 301, 335.
scutelloides, 336.
scutelloides W. Sm. var. baikalensis Skv., 299, 336.
scutelloides var. minutissima, 336.
silicea Skv., 299, 326.
sphaeroplora, 295.
subhamulata Grun. var. gibbosa Skv., 325.
subhamulata Grun. var. parallela Skv., 325, 301.
subhamulata Grun. var. undulata Hust., 326.
subocculata Hust., 299, 334.
subocculata Hust. var. baikalensis Skv., 334.
subplacentula Hust., 301.
subplacentula Hust. var. baikalensis Skv., 301, 333.
subtilissima Cleve, 326.
subtilissima Cleve var. okamurae Skv., 291.
tajoensis Cleve var. aboensis Cleve, 299, 336.
tumida var. suhasia, 285.
tuscula (Ehr.) Grun., 293, 299, 332.
unipunctata Skv., 302, 334.
ventralis Krasske var. okamurae Skv., 260.
viridula Kütz., 330.
vulpina Kütz., 299, 330.
vulpina Kütz. var. oregonica Cleve, 301, 330.
vulpina Kütz. var. oregonica Cleve fo. baicalensis Skv. and Mey., 323.
wojeschtschagini Skv. and Mey., 285.
wislouchii Skv. and Mey., 301, 285.
sp., 316.
Naviculaceae, 298.
Naxis M. Edw., 477, 554.
duacantha de Haan, 553.
hirta (A. M. Edw.), 554.
hirta Miers, 554.
Naxioides A. M. Edw., 477, 554.
hirta A. M. Edw., 554.
rondoni Rathbun, 554.
Nearina Burmeisio, 509.
Neldium affine (Ehr.) Cleve, 329.
affine (Ehr.) Cleve var. amphirhynchus (Ehr.) Cleve, 158.
affine var. baikalensis, 299.
dilatatum (Ehr.) Cleve, 299, 318.
dilatatum (Ehr.) Cleve fo. carta Skv., 299, 319.
dubium (Ehr.) Cleve, 198, 299, 319.
dubium (Ehr.) Cleve fo. constricta Hust., 198.
dubium (Ehr.) Cleve var. baikalensis Skv., 319.
dubium (Ehr.) Cleve fo. constricta Hust., 319.
iridis fo. borcynis (A. Mayer) Hust., 319.
iridis (Ehr.) Cleve var. amphigomphus (Ehr.) Han Heurck fo. angusta Skv., 197.
iridis (Ehr.) Cleve var. amplinta (Ehr.) Cleve, 197.
iridis (Ehr.) Cleve var. baikalensis Skv., 319.
lacus baikali Skv., 302, 326.
lanceolata Skv., 299, 319.
obliquestriatum A. S. var. nipponica Skv., 198.

Nematocarcinidæ Spence Bate, 469, 472, 489.
Nematocarcinus A. M. Edw., 469, 472, 489.
altus Spence Bate, 482.
emilieri var. producta de Man, 490.
productus Spence Bate, 490.
tenuirostris Spence Bate, 490.
undulatipes Spence Bate, 488.
Neodiplostomum Railliet, 137, 139.
alaiensis Tubangui, 137.
crocodilorum Tubangui and Manuhuĝan, 137.
faraf, a new trematode parasite of the cattle eyes, 137.
faraf Refuerzo and Garcia, 137.
orchilongum Noble, 139, 140.
Nemoura plutonis Banks, 276.
Neochauliodes formosana Okam., 275.
Neoperla, 271, 272.
formosana Okam., 272, 274.
kiapaiehi Banks, 272, 273.
nigrinalis Banks, 272, 273.
uniformis Banks, 272.
Nepal hornei, 276.
Nephrops Leach, 471, 473, 497.
thomsoni Spence Bate, 497.
Nephropsis, 471.
Nephrotoma nigrithorax (de Meij.), 147.
Neptunus de Haan, 475, 520.
pelagicus de Haan, 520.
pelagicus Linn., 520.
rugosus A. M. Edw., 520.
sanguinolentus de Haan, 520.
sanguinolentus (Herbst), 520.
xanthusii (Stimpson), 520.
(Achelous) granulatus M. Edw., 521.
(Achelous) granulatus Miers, 521.
(Achelous) orbicularis Alcock, 520.
(Achelous) orbicularis Richters, 520.
(Amphitrite) rugosus A. M. Edw., 520
(Amphitrite) rugosus Miers, 520.
(Amphitrite) spinipes Miers, 521.
(Amphitrite) tenuipes de Haan, 521.
(Amphitrite) tenuipes Haswell, 521.
(Hellenus) hastatoides Alcock, 520.
(Hellenus) hastatoides (F.), 520.
(Hellenus) spinipes Alcock, 521.
(Neptunus) pelagicus var. tritubercularis Miers, 521.
Nika, 468, 472.
Nikidæ, 469, 472.
Ningufia delfadoi Nava, 278.
Nitzschia Hassall, 300, 355.
acuta Hantz., 213, 356.
amphibia Grun., 213.
angustata (W. Sm.) Grun., 355.
baikalensis Skv., 356.
capitellata Hust., 356.
communis var. minuta, 296.
denticula Grun., 213.
denticulata Grun. var. baikalensis Skv., 355.
dissipata (Kütz.) Grun., 212, 356.
Nitzschia—Continued.
fonticola Grun., 356.
frustulum (Kütz.) Grun., var. perpusilla (Rabh.) Grun., 213.
kindermanniensis Krasske, 213.
gracilis Hantz., 356.
heidenii Meister, 213.
obtusa W. Sm. var. scalpelliformis Grun., 213.
okamura Skv., 213.
parvula, 296.
sigmoidea (Ehr.) W. Sm., 356.
tenuis, 296.
thermalis, 296.
tryblionella Hantz. var. debilis (Arn.) A. Mayer, 191, 213.
tryblionella Hantz. var. victoriæ Grun., 191, 213.
Noearctia, 440.
Nosiperla, 269.
Notha Horvath, 17.
Notonalia, 467–475, 478, 492, 495.
Notocaris Spence Bate, 468, 472, 484.
ocellus Spence Bate, 484.
Notochryon japonica McLach., 280.
uchidæ Kawasawa, 280.
Notolabella subalivacea Nakahara, 238.
Notostomus A. M. Edw., 469, 472, 490.
pentadactylus Spence Bate, 490.
perlatus Spence Bate, 490.
Noues elegans Banks, 285.
Noviidæ, 552.
Nutritive value and cost of the Philippine Constabulary ration, 69.

O

Ochthodromus mongolus, 434, 438.
Oeypoda rubra Fermineville, 541.
Oeypode V., 476, 542.
albicans Bosc., 542.
ceratophthalma P., 542.
cerathophthalma (Pall.), 542.
cordimana Desmarest, 542.
cordimana M. Edw., 542.
gaudichaudii M. Edw. and Lucas, 542.
lewis Dana, 542.
quadrata F., 542.
Oeypodidæ Ortmann, 476, 477, 542.
Oxypodinæ Dana, 542.
Odontidium Harrisonii, 296.
mesodon, 296.
Oenonophelia tranquebarica, 413.
Ogyris Stimpson, 468, 472, 482.
zibeus de Man, 482.
Oniscoidea de Haan, 477, 549.
armata de Haan, 549.
neptunus Adams and White, 549.
Onconhyna Stål, 10.
cuneiformis Drake, 11.
nitentis Drake and Poor, 11.
Oöleopidæ, 468, 473, 491.

Oödicopia Spence Bate, 469, 475, 491.
serratus Spence Bate, 491.
Oösporæ, 440.
Opephora, 500, 503.
martyi Herb., 507.
martyi Herb. var. baikalensis Skv., 293, 307.
Ophidopelma ornaticoxae End., 264.
Ophiophorus M. Edw., 468, 472, 475, 487.
brevirostris Spence Bate, 487.
Oreophoreus Rupp., 514.
(Oreotlos) angulatus Ihle, 514.
(Oreotlos) angulatus (Rathbun), 514.
Oriolus xanthonotus, 422, 423.
auratus, 422.
galbula, 422.
Orphania, 469.
Orthocina arenaria var. granulata, 296.
arenaria var. typica, 296.
roseana, 296.
Ortmannia Rathbun, 468, 472, 486.
sp., 486.
Osmylidæ, 233.
Ostracoda, 294.
Oxyrrhyncha, 549.
Oxyplacoroda Miers, 477, 550.
stimpsoni Miers, 550
Oxyrhyncha, 472, 473.
Oxystomata, 473, 510, 511, 515.
Oxiinæ, 522, 525, 530, 531.
Oxiinida, 528.
Oxius frontalis M. Edw., 528.

P

Pachycheles pulchellus Miers, 502.
Pachyrhina nigrithorax de Meil., 247.
Padso, 219.
Paguridæ Dana, 474, 500.
Paguridea, 474, 500.
Pagurinæ Dana, 474, 505.
hians Henderson, 508.
Pagurodes Henderson, 500.
Pagurodes Henderson, 474, 507.
hirsutulus Henderson, 507.
pilifrons Henderson, 507.
Pagurogaza Henderson, 474, 507.
spinosa Henderson, 507.
Pagurus F., 474, 502.
aculeatus F., 504.
acuer de Haan, 502.
bifrontis M. Edw., 502
cornutus M. Edw., 503.
cristatus (M. Edw.), 501.
cuticrosus white, 502.
depressus Ihle, 503.
dermatus Henderson, 502.
elegans M. Edw., 505.
exoptis Dana, 503.
fabimanus Dana, 503.
guttatus Oliv., 503.
hirsutimanus Randall, 505.
latens Randall, 505.
Pagurus—Continued.
latro F., 506.
punctulatus Oliv., 503.
semilimanus Henderson, 503.
setifer Hess., 503.
striatus Latr., 503.
tilicen M. Edw., 505.
vulnerans Thallwitz, 503.
wood-masoni Alcock, 503.
Palæmon F., 469, 472, 488.
carcinus F., 488.
grandimanus Randall, 489.
ida Ihle, 489.
japonica Cowles, 488.
lanceifrons Dana, 488.
lanceifrons var. montisbaconis Cowles, 488.
lar F., 488.
latidactylus Cowles, 488.
latidactylus Thallwitz, 488.
latimanus Martens, 489.
lepidactylus Cowles, 488.
lepidactylus Hilgendorf, 488.
philippinensis Cowles, 488.
sundaicus Ihle, 489.
Palæmonella Dana, 469, 472, 489.
orientalis Dana, 489.
Palæmonidæ Spence Bate, 469, 472, 488.
Paliciidæ Rathbun, 477, 548.
Palicus Philippi, 477, 548.
jukesii Alcock, 548.
jukesii (White), 548.
Palinostus, 470.
Palinuridæ, 470, 473, 496.
Palinurus, 470, 473.
fasciatus de Haan, 497.
ornatus F., 496.
penicillatus, 496.
versicolor Latr., 497.
Panthalidæ Spence Bate, 468, 472, 488.
Pandalopsis, 468.
Pandalus, 468.
carinatus Sm., 493.
Panopeus dentatus White, 528.
Panopidæ, 525.
Panulirus White, 470, 496.
homarus C. Nobili, 496.
ornatus (F.), 496.
penicillatus (Oliv.), 496.
penicillatus Rathbun, 496.
versicolor G. Nobili, 497.
versicolor (Latr.), 497.
Parada Horvath, 7.
Paralithodes, 468.
Paramithrax M. Edw., 477, 555, 556.
edwardsii Adams and White, 556.
edwardsii de Haan, 556.
Paramphithemum nigricaps Banks, 267.
Puranephrops, 471.
Parapaguridæ S. I. Sm., 474, 507.
Parapagurus Henderson, 474, 507.
abyssorum A. M. Edw., 507.
abyssorum Henderson, 507.

Parapenaeus rectacutus de Man, 493.
Paraperla, 271.
Parasites, tapeworm, of Philippine birds, 409.
Parastacus, 471.
Paratelphusa teldeniana M. Edw., 532.
Parathanma Sietzoe Bate, 468, 472, 485.
decorticus Spence Bate, 483.
immaturus Spence Bate, 483.
Paraxius, 471.
Paribacens, 470.
Parocblus Endl., 32.
Paronteles Fuhrmann, 416-424.
Parthenope F., 473, 557.
calappoides Adams and White, 558.
horrida Alcock, 557.
(Lambrus) valida v. Sieb, 557.
(Pseudolambrus) parva Rathbun, 557.
(Rhinolambrus) rudis Rathbun, 557.
Parthenopidæ, 473, 557.
Parthenopinæ, 557.
Pasoyan, 210.
Pasiphæa Savigny, 469, 473, 491.
propinqua de Man, 491.
sp., 491.
Pasiphæidæ, 469, 473, 491.
Passeriformes, 422.
Pelacarcinus Islandii M. Edw., 541.
Pelopia Meig., 42.
gracillima Kieff., 56.
Pelonia Dana, 477, 551.
sublimis Rathbun, 551.
Peltoperla formosana Klap., 269.
Penæidæ, 220, 467, 470, 473.
Penæidea, 470, 473, 492.
Penæus F., 219, 220, 470, 473, 492.
affinis Milne-Edw., 220 222,
ashiaka Kishinouye, 235.
canaliculatus Oliv., 220, 221.
carinatus Dana, 220, 492.
Ensicus Spence Bate, 493.
gracilis Dana, 493.
incisipes Spence Bate, 220, 221, 223, 493.
indicus Milne-Edw., 220, 221, 224, 492.
monodon F., 220, 221 224, 226, 492.
philippinensis Spence Bate, 493.
rectacutus Spence Bate, 493.
semisulcatus de Haan, 225, 492.
Pentacheles Spence Bate, 470, 473, 497.
Davis Spence Bate, 497.
Pentaneura Philippi, 22, 42.
alba Tokunaga, 42, 49.
bicolor Fr., 51.
bistata Wied., 50.
corvalis Kieff., 48.
Grisea Walk., 43, 50, 54.
dubia Meig., 44.
faleiger Kieff., 56.
fasciuiva Kieff., 42, 48.
gracillima Kieff., 43, 56.
interscptus Walk., 51.
Japonica Tokunaga, 42, 50.
Pentaneura--Continued.
kyotoensis Tokunaga, 43, 55.
lactea Meig., 48.
longipennis Tokunaga, 42, 52.
maculipennis Zett., 42, 45.
melanops Meig., 42, 50, 51.
melanura Meig., 55.
minuta Tokunaga, 42, 43.
monilis Kieff., 44, 46.
monilis Linn., 42, 44,
monticola Tokunaga, 42, 47.
multifascia Tokunaga, 43, 54,
muscicola Kieff., 43.
trigropunctata Staeger, 52.
octopunctata Tokunaga, 42, 46.
scrutigiber Kieff., 46,
setiger Kieff., 55.
Spinalipennis Kieff., 52.
sublineurvatus Goetghebuer, 48.
tripunctata Goetghebuer, 47.
Perenon Gistel, 476, 540,
gibbesi (M. Edw.), 540.
gibbesi Rathbun, 540.
planissimum Rathbun, 540.
Pericera Latr., 447, 456.
cornigera H. M. Edw., 536.
setigera Adams and White, 536.
tarata Adams and White, 536.
Periceridæ Miers, 477, 549, 562, 556.
Pericerinæ Stimpson, 553, 556.
Paripsæus quercicola End., 267.
sidneyensis, 267.
singularis Banks, 267,
Perissonemia Drake and Poor, 2, 3, 6.
neapolensis Dist., 5.
dignata Drake and Poor, 3, 5.
recentis, 6.
torquata Drake and Poor, 2, 3.
(Ulonemia) bonnevensis Dist., 4.
(Ulonemia) dignata Drake and Poor, 3.
(Ulonemia) electa Drake and Poor, 5.
(Ulonemia) illustris Drake and Poor, 4.
(Ulonemia) recentis Drake and Poor, 6.
(Perissonemia) torquata Drake and Poor, 2.
Perlidæ, 255, 260.
Petalidium, 470.
Peteinura, 470.
Petrolisthes Stimpson, 474, 507.
erlianeus Stimpson, 508.
gracilis Stimpson, 507.
marginatus Stimpson, 508.
rathbunæ Schmitt, 507.
Phalangipus, 477, 554.
filiformis Rathbun, 554.
tenuis Rathbun, 554.
Philippine birds, tapeworm parasites of, 409.
bullion, 490.
Constabulary ration, nutritive value and cost of, 29.
crustaceus decapods, check list of, 468.
shrimps of the genus Penæus, 219.

Philonicus, 450.
Philyra Leach, 475, 512.
platychcir de Haan, 512.
platycheira Heller, 512.
Phoberus, 421.
Phoca sibirica Gmel., 223.
Phyllobranchiata, 466–468, 472, 473, 478.
Phyllosoma, 470.
Phymodius A. M. Edw., 476, 528.
granulosus Miers, 528.
unguulatus A. M. Edw., 528.
Physantocheila Stål, 6, 10.
Physinotochila dentata Stål, 15.
crova (Pieber) Dist., 15.
philippinensis Dist., 15.
ravana (Kirk.) Dist., 15.
Physicochemical factors in Anopheline ecology, 125.
Pilumnidae, 522, 529, 530.
Pilumnoida, 529.
Pilumnus Leach, 476, 529.
de haani Miers, 529.
geemmatus Stimpson, 529.
orientalis Rathbun, 529.
sculptipusculus Adams and White, 530.
spinohirsutus (Lockington), 529.
spinohirsutus Streets and Kingsley, 530.
ursulus Adams and White, 529.
vesperitilio A. M. Edw., 529.
vesperitilio (F.), 529.
Pinna sp., 547.
Pinnotheres Latr., 477, 546.
affinis Borgert, 546.
cardii Bürger, 546.
concretatus Borgert, 546.
exiguus Börger, 547.
flavus Nauck, 547.
glaberrimus Borger, 546.
holothuriae Semper, 547.
latissimus Börger, 547.
latus Börger, 547.
modiolicola Börger, 546.
pisaeensis Börger, 547.
pusillus Stimpson, 547.
rotundatus Börger, 547.
Pinnotheridae, 477, 546.
Pinnotherinae, 546.
Pinnularia Ehrenb., 297, 339, 340.
abnormis Skv., 301, 339.
baicalensis Skv. and Mey., 329.
borealis Ehr., 294.
crassa Skv., 302, 338.
divergens W. Sm. var. japonica Meister, 294.
gentilis (Donk.) Cleve, 296.
gibba Ehr., 295.
gibba Ehr. fo subundulata Mayer, 296, 338.
gibba Ehr. var. baikalensis Skv., 299, 338.
gibba Ehr. var. nipponica Skv., 295.
gibba Ehr. var. okamurae Skv., 295.
Pinnularia—Continued.
gibba var. peckii, 296.
hemiptera, 295.
hemiptera Kütz. var. baicalensis Skv. and Mey., 330.
hustedtii Meister var. nipponica Skv., 295.
karelica Cleve var. japonica Hust., 294.
kisslucnsis Skv., 296.
lacus baikali Skv., 301, 339.
lacus baikali Skv. var. gibbosa Skv., 339.
lacus baikali Skv. var. lanceolata Skv., 339.
lacus baikali Skv. var. linearis Skv., 339.
lata, 297.
legumen Ehr., 294.
leptosoma Grun., 299, 337.
lepsitica, Cleve, 295.
major (Kütz.) Cleve, 296, 299, 339.
major (Kütz.) Cleve fo. minor Skv., 299, 338.
mesolepta var. stauroniformis, 295.
microstauron (Ehr.) Cleve, 294.
microstauron (Ehr.) Cleve var. kitaensis Skv., 294.
molaris Grun., 299, 337,
parvagerrl Reich. var. baikalensis Skv., 339.
pectinalis Skv., 302, 338.
pectinalis var. rostrata, 302.
pectinalis Skv. var. rostrata Skv., 338.
platycephala (Ehr.) Cleve, 294.
rangoonensis Grun., 295.
viridis (Nitzsch) Ehr. var. fallax Cleve, 296.
viridissima Skv., 301, 339, 340.
Pinnularia baikalis Nob., 339.
majores Cleve, 338.
parallelistriata Fr. Hust., 337.
tabellaria Cleve, 338.
Pisa Leach, 477, 554.
sinope Adams and White, 554.
(Nexia) diacantha de Haan, 553.
Pisaeus, 552.
Pisidonia Stimpson, 474, 508.
sculptum (M. Edw.), 508.
sculptum Ortmann, 508.
Planuela Latr., 416, 540.
depressa (F.), 540.
depressa M. Edw., 540.
depressa Say, 540.
depressa var. squamosa Alcock, 540.
depressa var. squamosa (Herbst), 540.
immaculata Lam., 540.
orientalis Stimpson, 540.
squamosa A. M. Edw., 540.
tuberculata Miers, 540.
Planusinae Dana, 540.
Platycheira, 468.
Platyonichus, 286.
Platyxanthus Miers, 477, 550.
barbachi Rathbun, 550.
semifera Rathbun, 550.

Pleuroxus Sponce Bate, 468, 472, 484.
brevirostris Spence Bate, 484.
laevis Baird, 484.
laevis var. semilaevis de Man, 484.
semilaevis Spence Bate, 484.
similis de Man, 484.
similis Rathbun, 484.
Plover, lesser sand, 434.
Podocnemus Philippi, 22.
Podophthalmine, 529.
Podophthalmus Lam., 475, 522.
vigil (F.), 522.
vigil Leach, 522.
Podopsis Hilgendorf, 554.
Polycarpides, 468, 472, 478.
Polybrachia, 470.
Pomatochelea, 471.
Pontocaris, 465.
Pontonia, 468.
Pontoniidæ, 462.
Pontophilus Leach, 468, 472, 476.
challengeri Ortmann, 478.
gracilis Spence Bate, 478.
japonicus Doflein, 478.
juncea Spence Bate, 478.
POOR, M. E., see DRAKE and POOR.
Porcellana pulchella Haswell, 603.
sculpta M. Edw., 593.
Porcellanidæ Dana, 476, 507.
Porcellanoidea Henderson, 474, 507, 508.
Portunidæ, 475, 515, 517, 532, 530.
Portuninæ, 517.
Portunus cælo-nobi Rose 520.
crucifer F., 517.
hastatoides F., 520.
vigil F., 522.
(Amphitrite) gladiator de Haan, 521.
(Charybdis) miles de Haan, 517.
Potamon, 475, 551.
grapsoides de Man, 532.
(Paratelphusa) grapsoides (M. Edw.), 531.
(Paratelphusa) tridentata (M. Edw.), 532.
(Potamon) grapsoides Rathbun, 532.
(Telphusa) angustifrons M. Edw., 532.
(Telphusa) lævis Wood-Mason, 532.
(Telphusa) leschenaulti (M. Edw.), 532.
(Telphusa) montana Heller, 532.
(Telphusa) philippina Martens, 532.
(Telphusa) similifrons (M. Edw.), 532.
Potamonidæ, 476, 516, 530, 531.
Primigenia, 503.
Procaris Intasaurus Tulaugni, 137.
Processa, 468, 472, 479.
australiensis Baker, 479.
sp., 479.
Processidæ Ortmann, 468, 472, 479.
Procladius Skuse, 22, 27.
chorens Meig., 29.
crassinervis Zett., 30, 32.
formosanus, 34.
Procladius—Continued.
insularis Kieff., 29.
insularis var. transens Kieff., 27.
iris Kieff., 27, 30.
lacteiclava Kieff., 28, 31, 33.
nipponicus Tokunaga, 28, 30.
Darwulus Kieff., 33.
sagittalis Kieff., 27.
(Procladius) chorens Meig., 29.
(Procladius) crassinervis Zett., 31.
(Procladius) insularis Kieff., 30.
(Procladius) insularis var. transiens Kieff., 30.
(Procladius) iris Kieff., 30.
(Procladius) lacteiclava Kieff., 31.
(Procladius) nipponicus Tokunaga, 32.
(Procladius) sagittalis Kieff., 28.
Proclodes, 469.
Progonomyia Alex., 177.
Protenthes Johannsen, 83.
punctipennis Meig., 83.
Protogonomyia Alex., 177, 178.
Protohermes costalis Walk., 275.
Protonemura brevilobata Klap., 274.
Protozoa, 294.
Psapheticus Wood-Mason, 533.
Psectrotanypus Kieff., 34.
Pseudobranchus, 470.
Pseudolimnophila nycteris Alex., 151.
Pseudophilyra Miers, 475, 512.
wood-masoni Alcock, 513.
Pseudotelphusa, 476, 533.
angulata Rathbun, 533.
Psilotanypus Kieff., 27.
Psocidæ, 255, 256, 265.
Psocus, 256, 267.
capitatus Okam., 267.
filicornis End., 261.
formosanus Okam., 267.
longicornis, 267.
obertus End., 262.
palliatus Hagen, 266.
sauteri End., 267.
sexpunctatus Linn., 257.
tokyoensis End., 267.
Psopheticus, 476.
hystrix Rathbun, 533.
Psoquilla marginipunctata Hagen, 268.
Pterocosmus lunigrus, 124.
Ptychognathus Stimpson, 476, 539.
altimanus Tesch, 539.
barbatus (A. M. Edw.), 540.
barbatus Ortmann, 540.
quinquedens Rathbun, 539.
Sharpei Rathbun, 558.
Puerto Galera, geology of, 239.
Pugettia Dana, 477, 551.
leptensis Rathbun, 551.
mindanaonsis Rathbun, 551.
Pycnogonida gatavber, 422, 421, 429.
Pylocheles, 471.
Pylochelidæ, 471.
Pyromaia franciscana, 422.

Q

Quadrella Dana, 476, 531.
coronata Dana, 532.
nitida Sm., 531.

R

Radiolaria Haeckel, 1.
Radiolarian Ooze, 1.
Radiolarians, 1.
Radiolarian Ooze, 1.
Radiolarians, 1.
Radiolarian Ooze, 1.
Radiolarians

Scrioleptus Gerstaecker, 471, 474, 500.
serripes Gerstaecker, 500.
Seal, Baikal, 293.
Semex penicillatus Ortmann, 496.
Serenthia sedalis Drake, 2.
vicinalis Drake, 1.
Sergestes M. Edw., 470, 473, 495.
intermedius Spence Bate, 495.
japonicus Spence Bate, 495.
Sergestidæ, 470, 473, 494.
Sergestinæ, 470, 495.
Sesarma Say, 476, 536.
aubryi A. M. Edw., 537.
aubryi de Man, 538.
bidens A. M. Edw., 536.
bidens (de Haan), 536.
bidentata Benedict, 536.
dorsumlevi M. Edw., 536.
edwardsii de Man, 536.
impressa M. Edw., 538.
livida, A. M. Edw., 537.
livida de Man, 537.
mederi M. Edw., 536.
meinerti de Man, 538.
obtonga de Man, 538.
similis Hess, 538.
smithi Edw., 538.
taeniolata Hürver, 536.
taeniolata White, 536.
taeniolium White, 536.
tetragona M. Edw., 538.
trapezoidea de Man, 537.
trapezoides Goer., 537.
unguiata de Man, 536.
unguiata M. Edw., 536.
(Chiromantes) livida Teach, 537.
(Parasesarma) damacense Rathbun, 537.
(Parasesarma) moluccense jamelense Rathbun, 536.
(Parasesarma) pangaurahense Rathbun, 537.
(Sesarma) bidentatum Benedict, 536.
(Sesarma) bidentatum Rathbun, 536.
(Sesarma) edwardsi philippinense Rathbun, 537.
(Sesarma) mindanaoense Rathbun, 537.
(Sesarma) palawense Rathbun, 537.
(Sesarma) palawensis Teach, 537.
(Sesarma) tectum Rathbun, 537.
(Sesarma) vicentense Rathbun, 537.
Sesarmine Dana, 536.
Sesterius Spence Bate, 469, 473, 492.
dubiosidentes Spence Bate, 492.
Shrimps, Philippine, 219.
Sialidæ, 275.
Sialis kuriensis Okam., 275.
Sicyonia, 470.
Sigmatoneura singularis Okam., 251.
Sigmoidea (Gros.) Rust., 366.
Sinamay, 230.
SKVORTZOW, B. W., Diatoms from Ikeda Lake, Sacuma Province, Kiushiu Island, Nipbon, 181.
Bottom diatoms from Olkon gate of Baikal lake, Siberia, 293.
Sogra negligens Navas, 288.
Sothenocaretinæ A. M. Edw., 477, 552.
auritus Rathbun, 552.
luzonicus Rathbun, 552.
nodosus Rathbun, 552.
Spilosmylus japonicus Okam., 278.
modestus, 278.
tuberculatus, 278.
Spinal cord of man, heterophyid ova in, 253.
Spilontocaris, 468.
Spiropagurus Stimpson, 474, 506.
spiriger (de Haan), 506.
spiriger Stimpson, 506.
Spongicola de Haan, 471, 473, 497.
venusta de Haan, 497.
Staurocera anceps Ehr., 200.
anceps Ehr. var. baikalensis Skv., 298, 323.
anceps Ehr. fo. gracilis (Ehr.) Cleve, 200.
anceps Ehr. var. hyalina Brun, and Perag., 323.
baikalensis Skv., 299, 324.
cruciculo, 295.
lanceolata, 295.
monisona, 295.
phoenicenteron Ehr., 298, 323.
phoenicenteron Ehr. fo. gracilis Dip., 199.
phoenicenteron Ehr. var. sigmata Meister, 199.
sigmata (Meister) nob., 199.
sigmata (Meister) nob. fo. gracilis Skv., 200.
Stenopidæ Spence Bate, 471, 473, 497.
Stenopidea, 471, 473, 497.
Stenopsocus Hagen, 252.
aphidiformis End., 258.
externus Banks, 258, 259.
formosanus Banks, 258, 259.
tibialis Banks, 259.
Stenopus Latr., 471, 473, 497.
hispidus Adams and White, 497.
hispidus Dana, 497.
Stephanitus niloris Drake and Poor, 17.
quercus Burgs., 17.
quercus Berg., 17.
typica Dist., 16.
typica Horvath, 16.
Stephanodiscus astræa (Ehr.) var. minutula Grun., 298, 306.
carconensis Grun. var. pusilla Grun., 198.
hantzschii Grun., 298, 306.
Stereomastis, 470.
Stichopus variegatus, 547.
Stimulopalpis, 263.
Stoichamus, 468.

Strentopelia dussumieri, 410, 413, 414, 425.
orientalis, 413.
Streptolbrix, 439, 440, 460.
Stylodactylidæ, 460, 473, 490.
Stylodactylus A. M. Edw., 460, 473, 490.
sibogae de Man, 490.
Suggó, 219.
Suphalaxus umbrosa Peters., 289.
Suphalaxus formosanus Peters., 288.
Surirella acuminata Hust., 359.
acuminata Hust. var. baikalensis Skv., 359, 361.
baikalensis, 297.
biseriata Breb., 295, 296, 361.
biseriata Breb. var. bifrons (Ehr.) Hust. fo. bipida Skv., 295.
biseriata var. bifrons fo. punctata, 300.
biseriata Breb. var. bifrons (Ehr.) Hust. fo. punctata Meister, 357.
biseriata Breb. var. constricta Grun., 315.
biwensis Skv., 296.
conifera Skv., 300, 360.
conifera Skv. var. punctata Skv., 350, 360.
curvifacies J. Brun, 302, 359.
didyma Kütz. var. minor Skv., 300, 358.
elegans Ehr., 215.
elegans Ehr. var. norvegica (Eulenst.) Brun, 215.
fallehorni O. Müll. var. baikalensis Skv. and Mey., 360.
fluctis (W. Sm.) Grun., 300, 358.
granulata Greirup, 303, 358.
helileni Hust., 216.
lacus baikali Skv., 300, 360.
lacus baikali Skv. var. marginata Skv., 360, 361.
lacus baikali Skv. var. paradoxa Skv., 361.
lacus baikali Skv. var. punctata Skv., 361.
lanceolata Hust., 361.
linearis W. Sm., 214, 300, 357.
linearis W. Sm. var. helvetica (Brun) Meister, 215, 300, 357.
margaritifera Hust., 361, 362.
nipponica Skv., 216.
nobilis, 296.
ovata Kütz. var. baikalensis Skv. and Mey., 359.
pauciden Skv., 300, 361.
pauciden Skv. var. punctata Skv., 300, 361.
prehensilis Skv., 302, 359.
robusta Ehr., 214.
robusta Ehr. fo. hustedtiana (Mayer) Hust., 214.
robusta Ehr. fo. lata Hust., 214.
Surirella—Continued.
robusta Ehr. var. okamurae Skv., 214.
robusta Ehr. var. splendida (Ehr.) Van Heurck, 214.
robusta Ehr. var. splendida (Ehr.) Van Heurck fo. nipponica Skv., 214.
smithii, 296.
spiralis Kütz., 360.
tenuis Mayer var. nipponica Skv., 216.
terryana Ward, 216.
turgida W. Sm. fo. baikalensis Skv., 308, 358.
turgida var. lanceolata Wisl. and Kolbe, 357.
undentata Skv., 300, 360.
unipodes Skv., 300, 360.
Surypodidæ Stimpson, 549.
Synalpheus Spence Bate, 463, 472, 482.
carinatus var. oblanensis de Man, 482.
fossor var. propinqua de Man, 482.
neomeris (de Man), 482.
paumeris Nobili, 482.
pescadorensis Coutière, 482.
Synaxes, 470.
Synaxidæ, 470, 495.
Synaxidea, 473.
Syndesmesa (Lasiodiamesa) crassipilosa Tokunaga, 57.
(Lasiodiamesa) pilosa Kieff., 58.
(Syndesmesa) bicolor Tokunaga, 56.
(Syndesmesa) takatomea Tokunaga, 57.
Synedra acus, 295.
acus Kütz. var. angustissima Grun., 308.
acus Kütz. var. radians (Kütz.) Hust., 308.
amphicephala Kütz., 198.
bicaps Kütz., 308.
bilunaris, 296.
gracilis, 296.
Junavia var. genuina and var. campyla, 298.
parasitica W. Sm., 194.
rumpens Kütz., 298, 309.
rumpens Kütz. meneghiniana Grun., 193.
rumpens Kütz. var. okamurae Skv., 194.
ulna (Nitzsch) Ehr., 193, 298.
ulna (Nitzsch) Ehr. var. biceps (Kütz.), 198, 308.
ulna (Nitzsch) Ehr. var. danica (Kütz.) Grun., 308.
ulna (Nitzsch) Ehr. var. subaequalis Grun., 303.
vaucheriae, 296.
vaucheriae Kütz. var. capitellata Grun., 298, 309.
Systellomphi, 469.

T

Tabellaria fenestrata (Lyngb.) Kütz., 198, 298, 306.
flocculosa var. ventricosa, 296.

Tanistoloma ingens End., 268.
Talamita bryona var. crenata Richters, 518.
Tanypodinæ, 21.
Tanypus Meig., 22, 33.
formosanus Kieff., 35.
mallis Kieff., 44.
punctipennis F., 33.
Tapeworm parasites of Philippine birds, 409.
Taphrostethus quinqueostatus Fleber, 1.
Teloneuria Costa, 2.
borneensis Dist., 4.
Telphusa, 531.
Telphusa angustifrons A. M. Edw., 532.
grapsoides White, 531.
hydrodromus Gerstaecker, 532.
Ikehamaiti A. M. Edw., 532.
montana Dürger, 532.
philippina Martens, 532.
planatifrons M. Edw., 532.
Telphusidæ, 516, 530, 531.
Tetracyclus lacustris Raffa, 208, 306.
TEVES, JUAN S., The geology of Puerto Galera, Mindoro, 289.
Thalamita Latr., A. M. Edw., 476, 518.
admeta Alcock, 518.
admeta (Herbst), 518.
crassimana Dana, 519.
crenata Dana, 519.
crenata de Man, 519.
crenata (Latr.), 519.
dane Stimpson, 519.
integra Dana, 519.
investigatoris Alcock, 518.
prymna (Herbst), 519.
prymna M. Edw., 519.
savignyi A. M. Edw., 518.
spinimana Dana, 519.
stimpsoni A. M. Edw., 518.
truncata de Man, 518.
wood-masoni Alcock, 518.
Thalamitinæ Rathbun, 517.
Thalamitoides, A. M. Edw., 476, 519.
tridens A. M. Edw., 519.
Thalassina Latr. 471, 474, 493.
anomala de Man, 493.
anomala (Herbst), 493.
scorpionides Latr., 493.
Thalassinidæ, 471, 474, 493.
Thalassocaridæ, 469, 472, 484.
Thalassocaris Stimpson, 468, 472, 485.
crinita (Dana), 485.
crinita de Man, 486.
crinitus Bate, 485.
Thamastocheles, 471.
Thamastochelidæ, 471.
Thenus Leach, 470, 473, 496.
orientalis M. Edw., 496.
orientalis Rumph., 496.
Tlarinia Dana, 477, 555.
gracilis Dana, 556.
Tinsis cross Walk., 16.
Tingitidæ 1.
from Malaysia and Madagascar. 1.
Tipula (Libodesis Alex., 147.
Tipulidæ, 143.
from Eastern Asia, 143.
Tipulinæ, 144.
Tloe Adams and White, 514.
strigulatus Rathbun, 514.
Togoperla sequalis Banks, 269.
TOKUNAGA, MASAAKI, Chironomidæ from Japan (Diptera), IX: Tanypodinæ and Diamesinæ, 21.
Trachypeplus bakeri Drake, 12.
Trapezia Latr., 476, 520.
arcuata Dana, 521.
arcuata var. inermis A. M. Edw., 521.
cymodoce (Herbst), 520.
cymodoce Miers, 520.
cymodoce var. dentata Dana, 521.
cymodoce var. dentata Ortmann, 521.
dentata A. M. Edw., 520.
dentata Dana, 521.
ferruginea Dana, 521.
miniata Jacquinot et Lucas, 521.
reticulata Stimpson, 521.
rufopunctata (Herbst), 521.
rufopunctata Miers, 521.
Trematode parasite of the cattle egret, 197.
Trentepohlia candidipes, 176.
(Pleiomongonas) candidipes Edw., 177.
(Pleiomongonas) subcandidipes Alex., 176.
Treron sp., 413.
Trichobranchiata, 466, 467, 470, 473, 495, 508.
Trichoptera, 294.
Trichobunyrus Kieff., 27.
insularis Kieff., 30.
Tridacna Bürner, 547.
Tripsea, 471.
Tropicaridæ, 469, 472, 490.
Troplocaris, 489.
TUBANGUI, MARCOS A., and VICTORIA A. MASILUNGAN, Diplostomis Amphacanthi gen. et sp. nov., an Acanthocephala parasitic in a marine fish, 183; Tapeworm parasites of Philippine birds, 409.
Tubellaria, 294.
Tuberculosis and leprosy, variations in the actinomycetes in connection with the theory of the mycotic nature of the viruses of, 439.
Turbidity in anopheline ecology. 125.
Turnix, 229.
Tylopyge minor, 270.
planidorsa Klap., 270, 271.
signata Banks, 270.
Tympanomerus Rathbun, 477, 546.
philippinensis Rathbun, 546.
Typhlocarcinops Rathbun, 476, 534.
angustifrons Rathbun, 535.
decrescens Rathbun, 534.
marginata Rathbun, 534.
Typhlocarcinopsinæ, 534.

Typhlocarcinus Stimpson, 476, 536.
crateriferi Rathbun, 534.
Typton, 466.

U

Uca Leach, 477, 542.
acuta Dolfein, 543.
acuta (Stimpson), 543.
annulipes (Latr), 542.
arcuata (de Haan), 543.
cumulata (M. Edw.), 543.
cultrimana (White), 546.
dussumieri (M. Edw.), 548.
dussumieri Ortmann, 543.
fortipes (de Man), 544.
latimeri M. Edw., 545.
marionis (Desmarest), 544.
marionis var. natis (Alcock), 544.
minarmi Rathbun, 544.
rathbunæ Pearse, 544.
rubripes Jacquinot and Lucas, 545.
signata (Heller), 543.
tetragona (Herbst), 543.
triangularis (A. M. Edw.), 543.
triangularis Nobili, 543.
urvillei M. Edw., 544.
vocator (Herbst), 544.
zeylonica Rathbun, 544.
Ulenemia Drake and Poor, 2, 3.
dignata Drake and Poor, 2, 3.
Urena jolenia, 15.
Urocyphus Henderson, 471, 474, 499.
spinimarginatus Henderson, 499.
Urna White, 476, 539.
arcuiipes White, 539.

V

VANOVERBERGH, MORICE, Holm construction, 67.
Variations in the actinomycetes, in connection with the theory of the mycotic nature of the viruses of tuberculosis and leprosy, 459.
Varuna M. Edw., 476, 539.
altimana Rathbun, 539.
litterata (F.), 539.
litterata M. Edw., 539.
Varuninæ Alcock, 539.
Velana, 294.
Vitex trifolia, 15.
Vocabulary, Iloko, 67.

W

Wild chicken, 417.
Willemoesia, 479.

X

Xanthasia White, 547.
muricera White, 547.
Xanthidæ, 466, 476, 518, 517, 522, 530.
Xanthinæ, 522, 530.
Xantho Leach, 476, 525.
affinis de Haan, 525.
lævis Stimpson, 524.
bidentatus A. M. Edw., 525.
cultrimanus White, 526.
exaratus var. nudipes Ortmann, 526.
granulosus Rupp., 523.
hirsutissimus Rupp., 527.
immarckii M. Edw., 525.
octodentatus M. Edw., 528.
(Leptodius) cavipes Alcock, 526.
(Leptodius) cavipes (Dana), 525.
(Leptodius) corbyrius Alcock, 525.
(Leptodius) exaratus Alcock, 525.
(Leptodius) exaratus (M. Edw.), 525.
(Leptodius) nudipes Alcock, 525.
(Leptodius) nudipes (Dana), 525.
Xanthodes Dana, 475, 528.
depressus Miers, 528.
depressus White, 528.
granulosatus Dana, 526.
hemphilii Lockington, 524.
lamarckii A. M. Edw., 526.
Xanthodiidæ, 528.
Xanthoidea, 526.
Xanthusia, 477.
Xenophthalmidæ, 548.
Xenophthalmus White, 477, 548.
latifrons Bürger, 549.
pinnotheroides White, 548.

Z

Zebrida White, 475, 559.
adamsi White, 559.
Zoea, 466, 469, 471.
Zoëtocaria Spence Bate, 469, 473, 492.
approximans Spence Bate, 492.
Zozymoides, 528.
Zozymus tomentosus M. Edw., 526.

THE PHILIPPINE BUREAU OF SCIENCE

RECENT MONOGRAPHIC PUBLICATIONS

SUMMARY OF PHILIPPINE MARINE AND FRESH-WATER MOLLUSKS. By Leopoldo A. Faustino. Order No. 485. Bureau of Science Monograph 25. Paper, 384 pages. Price, $2 United States currency, postpaid.

SECOND TEN-YEAR INDEX OF THE PHILIPPINE JOURNAL OF SCIENCE, Volume 11 (1916) to Volume 28 (1925). By Winifred I. Kelly. Order No. 486. Bureau of Science Monograph 26. Paper, 381 pages. Price, $2 United States currency, postpaid.

FILTERABLE VIRUS AND RICKETTSIA DISEASES. By Earl Baldwin McKinley. Order No. 487. Bureau of Science Monograph 27. 442 pages, 70 plates, and 7 text figures. Prices, paper, $2.50; bound in full red keratol, $4, United States currency, postpaid.

A STUDY OF THE IGOROT LANGUAGE AS SPOKEN BY THE GONTOC IGOROTS. By Margaret P. Waterman. Order No. 488. Bureau of Science Monograph 28. Paper, 142 pages. Price, $0.75 United States currency, postpaid.

EXPERIMENTAL STUDIES OF DENGUE. By James Stevens Simmons, Joe H. St. John, and Francois H. K. Reynolds. Order No. 489. Bureau of Science Monograph 29. Paper, 489 pages, 3 plates, and 159 text figures. Price, $3.50 United States currency, postpaid.

PHILIPPINE LAND MAMMALS. By Edward H. Taylor. Order No. 490. Bureau of Science Monograph 30. Paper, 548 pages, 25 plates, and 25 text figures. Price, $2.50 United States currency, postpaid.

THE PHILIPPINE JOURNAL OF SCIENCE

Manuscripts intended for publication in the Philippine Journal of Science should be sent to the Editor, Philippine Journal of Science, Bureau of Science, post-office box 774, Manila, P. I.

One hundred separates of each paper published in the Journal are furnished to the author without charge. Additional copies may be had at the author's expense if ordered when the manuscript is submitted for publication.

The Journal is issued twelve times a year. The subscription price is 6 dollars United States currency per year. Single numbers, 50 cents each.

Subscriptions may be sent to the Business Manager, Philippine Journal of Science, Bureau of Science, post-office box 774, or to the Publications Division, Department of Agriculture and Commerce, post-office box 302, Manila, P. I., or to any of the agents listed below.

Publications sent in exchange for the Philippine Journal of Science should be addressed: Scientific Library, Bureau of Science, post-office box 774, Manila, P. I.

AGENTS

The Macmillan Company, 60 Fifth Avenue, New York, N. Y.
Martinus Nijhoff, Lange Voorhout 9, The Hague, Holland.
G. E. Stechert & Co., 31–33 East 10th Street, New York, N. Y.
The Maruzen Co., Ltd., 6 Nihonbashi, Tori-Nichome, Tokyo, Japan.

CONTENTS

	Page.
TUBANGUI, MARCOS A., and VICTORIA A. MASILUNGAN. Tapeworm parasites of Philippine birds	409
KEDROWSKY, W. I. Variations in the group of Actinomycetes, in connection with the theory of the mycotic nature of the viruses of tuberculosis and leprosy	439
ESTAMPADOR, EULOGIO P. A check list of Philippine crustacean decapods	465
BOOKS	561
ERRATUM	571
INDEX	573

The articles in the Philippine Journal of Science are indexed in the International Index to Periodicals, New York, N. Y.